THE TIMES
Higher Education
SUPPLEMENT

Lecturers attack Clegg delay on pay study

by David Jobbins

University lecturers are poised to reject proposals from the Clegg Commission which will delay a study of their pay by up to 18 months.

The executive of the Association of University Teachers was meeting in special session today to study the steps it should take following the latest Clegg plans which were disclosed in last week's *Times*.

Union members are said to be angered at the idea put to the AUT, university employers and the Department of Education that there should be a six-month feasibility study of the viability of a much longer comparability exercise than has been discussed up to now. The commission expects that if the longer study does prove feasible and acceptable to all the parties, it could take far longer, with even the DES talking of a total timespan of 18 months.

There are added complications in that the commission still wants to use the factor plan approach which it admits failed when it studied the public sector teachers' pay. The AUT has repeatedly said it does not think this approach is appropriate. Clegg's decision to abandon this part of the teachers' study can only reinforce its view.

The study would be chaired by Mr Peter Gibson, a former director of BP. Professor Hugh Clegg, who in any case wants to part with the commission in September, is one of two university don members who will withdraw because of his direct interest.

The reference to Clegg was made as part of the 1979 pay deal, and lecturers are already receiving 6 per cent on account, with a further instalment in the autumn.

"*Our members have been firmly promised a final Clegg increase on October 1. There is no way we are going to be content to have this increase delayed any further*", AUT general secretary Mr Laurie Supper said.

Laurie Supper (left), AUT general secretary, says the latest Clegg (right) plans are a breach of faith.

"This would be in breach of an agreement entered into in good faith and we are asking the other parties to the negotiations to join us in finding a solution to this problem which has left us all in difficulties."

The AUT, DES and university employers met on Tuesday to explore the implications. The likely outcome of today's AUT executive was unclear, but union leaders will have in the forefront of their minds the pressure likely to be exerted by rank-and-file lecturers in advance of the national council meeting in Liverpool early next month. Early indications are that AUT members are angered and anxious at the move.

At first the commission had been expected to report this summer but expectations later switched to the early autumn.

The row is further fuelled by the speculation about the commission's future, which looks increasingly uncertain although the official word is that it is still under consideration.

Employers and unions have now accepted in principle the 17-25 per cent increases for college and polytechnic lecturers recommended by Clegg. On Monday the management expects to be in a position formally to offer salaries derived from the Clegg report.

The major outstanding issues are Clegg's peripheral recommendations on college staff. There is a general expectation that the national joint council on conditions of service will be asked to implement the recommendation that research staff should be brought into negotiations.

Secondly the management is expected to make an offer on Monday based on Clegg's call for a "modest" increase in the number of lecturer II posts.

Lastly the unions are hoping to win at least an agreement in principle for the implementation of the recommendation that part time staff should be paid pro rata rates.

"While we realize the matter is complex, the principle is simple and even if the final working date was to be delayed, we will expect to settle the broad lines and timetable for implementation as part of the current negotiations", said Mr Peter Dawson, general secretary of the National Association of Teachers in Further and Higher Education.

Monday's meeting promises to be lengthy, for as well as tying up the last details of the Clegg reference it will mark the opening of talks on the lecturers' 1980 claim for *restoration of the Houghton differentials* plus inflation since last April.

Referring to reports of the ability of the education authorities to meet substantial pay demands, Mr Dawson said: "Any suggestion that 7 per cent would be a reasonable figure would meet with the most hostile reaction from the members."

● The first meeting of the Scottish teachers salaries committee to discuss implementing the Clegg Commission report has failed to reach agreement, although negotiators are hopeful of a settlement next week, writes Olga Wojtas

The colleges of education and central institutions, both of which negotiate separately from the STSC, do not meet for another two weeks, but are expected to fall in with STSC agreements.

Although management and further education representatives on the STSC have agreed to accept Clegg and add 18.3 per cent to the total FE salary bill, there are problems with the school sector, where there are more glaring differences between the Scottish and English pay scales.

The Scottish Further Education Association said the delay in reaching a settlement illustrated the need for separate negotiating machinery for the tertiary sector. "This has been recognized for too long as an urgent priority without any sign of action" it said.

Kirklees accused of 'control by audit'

The governors of Huddersfield Polytechnic have accused Kirklees Council of using an audit report on the financial affairs of the college as a "springboard" to gain control of the college.

They are convinced that the only way to avoid a head-on collision between the college and local authority would be for the Secretary of State for Education, Mr Mark Carlisle, to intervene "as a matter of urgency".

In a strongly worded statement the five governors given power to act for the college including the rector, Mr Ken Durrands, say the local authority used the audit report "to exercise their prejudices and increase misconceptions about the role and benefit of the polytechnic in the community".

The report was published last December after a nine-month audit carried out by the council's director of finance, Mr Peter Sharatt. It accused senior staff of financial maladministration and a lack of accountability and responsibility.

It claimed among other items that college transport was misused, that equipment and stores were not accounted for, and that £70,000 was lost by wrong costing of a course.

After consultations with other experts and personal investigation of the claims in the report, the governors say they are convinced the report is "discredited and intemperate to say the least".

They have expressed their full support to the rector, Mr Ken Durrands, who is now back at work at the college following an operation. They admit the audit showed "some irregularities and procedural deficiencies" but say they do not justify the dismissal or suspension of any members of staff.

Even if the report was accurate, the loss shown up was only about £10,000, an insignificant sum compared to the annual budget of the polytechnic of about £12m, say the governors.

SSRC faces grilling over post graduate results

A recent survey carried out by the Social Science Research Council reveals that less than half its postgraduate research students registered in 1973 had obtained their PhDs six years later.

The SSRC say it is highly perturbed by the findings of the survey. Its chairman, Mr Michael Posner, is likely to be faced with stiff questioning on the results when the council appears before the Public Accounts Committee on May 7.

The survey shows that of the 2,371 students registered for research degrees in 1973, only 42 per cent had obtained their PhDs by 1979. A further 42 per cent were still registered.

Of the postgraduate students on course work, 65 per cent finished the course and obtained their degrees. These figures compare favorably with similar courses in the physical sciences and with undergraduate figures.

Although the SSRC is disturbed by the completion figures for postgraduate research students, it will be emphasizing to the Public Accounts Committee that it is not usual for social science students to finish their PhDs within the strict time limit of three years.

Responsibility is shared with the institution where the student is registered and many students carry on working for their research degrees after taking full-time employment as is demonstrated by the 42 per cent still registered after six years.

A further study of SSRC students registered for PhDs, whose courses terminated between 1973 and 1975, showed that only about 21 per cent had published their degrees.

However the growing concern about completion rates has led the SSRC to make more linked awards in research training. In 1978-79 99 out of 1,179 research students had linked awards compared with 36 the previous year.

The council's postgraduate training board feels that attaching students in this way to research teams working on specific projects will encourage them to finish their PhDs more quickly.

This strategy is being promoted in particular by Mr Posner who feels that a more disciplined form of PhD would place the student under closer supervision particularly in the fields of economics, sociology, human geography and management subjects.

Poly chiefs unveil funding plan

by Paul Flather

Polytechnic directors have unveiled a long-term strategy which would overcome the erratic funding in this year's budgets and lead to the setting up of a national body to supervise all public sector financing.

The strategy is revealed in a confidential paper prepared by the Rev Dr George Tolley, principal of Sheffield Polytechnic, and approved by the Committee of Directors of Polytechnics at its annual meeting in Brighton last week.

The paper outlines three broad principles for preparing a long-term financial strategy. First, the directors want a method of comparing polytechnic costs with the universities, who, they believe, receive *preferential treatment* under existing arrangements. They also want to compare costs between polytechnics.

Secondly, the directors insist that whatever solution is found to polytechnic funding problems, it should leave institutions with the maximum amount of independence and flexibility within their overall budgets.

Finally, the CDP wants to be sure that any interim measures adopted to *improve the existing pooling system* should pave the way for some long-term arrangements which will end the confusion in college budgeting.

The paper coincides with a major campaign launched by the CDP to press the government to fund polytechnics on the same basis as universities. Figures prepared by the CDP show that polytechnics lost about £150m in 1978-79 because of the way full-time equivalent students (FTES) are calculated.

In universities part-time students count for half a full-time student, but in colleges and polytechnics they count for 0.15 of FTE if they attend one evening a week, and 0.33 if they attend a whole day and evening a week.

Dr Raymond Rickett, director of Middlesex Polytechnic and the new chairman of the CDP, said there was no case for paying less to polytechnics.

"There is absolutely no justification in funding polytechnics on a separate level. We have the ludicrous situation of that sector of higher education most concerned with wealth creation being the least well off" he said.

The CDP paper on long-term strategy recommends that an interim proposals for *funding for* 1980-81 drawn up by the Department of Education and Science should contain the seeds of a more equitable long-term arrangement.

It calls for a limit on the financial burden on local authority rates, some account to be taken of changes and shifts in student numbers, and a solution to major anomalies in the funding individual colleges.

TUC day of action

The TUC's May 14 "day of action" has froced the Association of Polytechnic Teachers to postpone its which is not affiliated to the TUC, had planned the meeting, due to be addressed by education under-secretary Dr Rhodes Boyson, for that day.

But the likely disruption of public transport has led to a change of date to May 29.

NEXT WEEK

Sartre's life and work
Philip Pettit on the philosophy on language
Peter Scott on Chengdu University
The universities and continuing education
Our planet's resources

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Computer dices with death, 1984-style

Computers rush in where angels fear to tread. While the world held its breath this week after the abortive American raid on Iran, Lancaster University's computer was brashly predicting the state of international relations in 1987.

The prediction was based on a simulated model of world politics devised by Dr Paul Smoker, the university's reader in peace and conflict research. Inside the machine's data banks was information about international violence, trade, public opinion, political stability and natural resources.

Teams of "experts", called from visitors to the university on its open day, represented major powers, multinational corporations, the United Nations, world press and other power brokers. Each team was presented with the world "scenario" in 1984 and set to work making life or death decisions about events.

THE SCENARIO: It is 1984 and Soviet-United States relations have continued to deteriorate since Afghanistan. The Soviet Union has refused to attend the Olympics in Los Angeles despite a plea from Mrs Thatcher that politics and sport should be kept separate.

Press reports suggest that the Chinese have exploded a medium size atomic device in the Western Sinkiang region, and the Russians have warned the Chinese against "regional imperialist adventures".

THE OUTCOME: Three simulated years later and there has been no nuclear holocaust, although tension is increasing. In 1987 the oil-producing nations have raised the price of oil so high that they are in a dominant position. At that point the Lancaster experts called it a day.

According to Dr Smoker, the computer world power game has a good track record, with its predictions coming close to reality in a third of all examples used. It differs from traditional international game-playing by incorporating economic and internal political variables.

Its main purpose, however, is to familiarize students with the pattern of international relations. There has been no request for a loan from the Pentagon.

Bill may be introduced to curb Oxford 'serfdom'

by Ngaio Crequer

A Private Member's Bill may be introduced to force some Oxford colleges to increase the pay of their manual workers and end what a union has described as semi-serfdom.

The National Union of Public Employees claims that about half of Oxford University's colleges are paying their manual staff less than nationally agreed rates. MPs are now considering Parliamentary action. The issue has already been raised in the House of Commons and Professor Hugh Clegg has told the union that the Comparability Commission he chaired thought Oxford and Cambridge were included in its pay reference.

Oxford has never been part of the national consortium which negotiates pay for manual workers in other universities. In its first comparability exercise the Clegg Commission recommended a minimum rate of £1.21 an hour for university manual workers, payable from last November, with a further increase in April.

But according to Mr Rodney Bickerstaffe, a NUPE national officer, about half the Oxford colleges have failed to implement the rates or their equivalent and staff are paid as low as 60p to 99p an hour.

He said: "The fact that they are not in the national consortium is irrelevant. Everyone else has either implemented Clegg or its equivalent. Some Oxford colleges are very rich and yet pay disgusting rates of pay. We have instances of people working 60 hours a week for £45 a week less tax.

"It is semi-serfdom. I just hope they will agree that manual workers should be paid reasonable wages, and realize that their good name is at risk."

At the end of last year NUPE took St. Anne's to the Central Arbitration Committee to try to raise the rates of pay. The action failed when the committee ruled that similar workers in other Oxford colleges were paid similarly.

This week NUPE obtained clarification from the Clegg Commission on the status of their pay recommendation. Professor Clegg said: "Determining the scope of a reference is not part of the commission's functions but had the commission been aware that college employees were not covered we would have expressed the hope that the colleges would apply the rates recommended for university employees."

NUPE-sponsored MPs and others are now considering what form of Parliamentary action to take. Mr Reginald Race, Labour MP for Wood Green, has already raised the "disgraceful failure" of the Oxford colleges to implement Clegg in the House of Commons.

He said this week: "Oxford may find itself facing a Private Member's Bill. I am discussing possibilities with my colleagues, as a means of imposing a settlement. Or we may take other action in the House."

Boyson urged to intervene in college's Brunel merger

by John O'Leary

The academic staff of Shoreditch College, Taunton, have written to Dr Rhodes Boyson, under-secretary for higher education, asking him to intervene in the college's merger with Brunel University. They have warned him that the present arrangements could damage the very subject (design technology) they were designed to safeguard.

In addition, both the National Association of Teachers in Further and Higher Education branch at Shoreditch and the Association of University Teachers at Brunel have protested at the handling of appointments to the new department of design technology to be formed from the merger.

Academics at Shoreditch are upset that only 14 of them have been offered permanent posts in the new department despite a student figure of 375 students, and extra controversy has arisen from the appointment of Mr Tom Dodd, a former London Education Authority adviser for the college, to a post in the new department which was never the subject of a merger.

Brunel's AUT representatives are understood to have tabled a motion for next week's senate meeting criticizing the vice-chancellor, Dr Stephen Brown, for the manner of Mr Dodd's appointment. Although Dr Alan Reynolds, the AUT's senate representative, refused to confirm this, he said that there were legally enforceable agreements with the university to advertise all posts.

At Shoreditch, a NATFHE delegation met Mr John Bevan, education official of the ILEA, which later addressed this whole staff to answer a range of critical questions. He refused a request to reopen negotiations with Brunel to press for more of the college staff to be appointed but agreed to take up the question of 17 staff offered only one year contracts to complete courses which will run for two more years.

In their draft letter to Dr Boyson, agreed upon unanimously at a staff meeting last month, Shoreditch academics claim that the posts offered will provide a grossly inadequate number of staff for the proposed courses, reflecting unnecessarily low projections of student numbers. They complain of unrealistically high entry requirements, and "an overhasty bias" towards engineering and away from the college's specialism of woodworking in the appointments.

The draft concludes: "It would seem that without DES intervention the intentions behind the merger will fail to be realized with consequent disastrous effects on the schools." The merger was proposed by Mrs Shirley Williams, as Secretary of State for Education.

AUT threatens action on school closures

The Association of University Teachers will obstruct the passage of the University of London's new statutes if there is a "premature" attempt to close any medical school.

The association said this week that unless it receives adequate assurances about the way the Flowers report on London's medical school is handled, it will lodge a *petition with the Privy Council* objecting to the statutes.

Such a move, which would prolong implementation of the statutes for another year, would produce gloom in the university, which has been trying to change its statutes, at great and unquantified cost, for the past seven years.

The new statutes have had a chequered history. They were withdrawn earlier from the Privy Council because of a procedural objection that consent to them had not been obtained strictly according to regulation. A new procedure was agreed, the statutes were represented to the university institutions and have now returned to the Privy Council.

If there were no objections, the statutes would go to Parliament and then be approved by Her Majesty in Council in the late summer. But any objections made by the deadline of June 19 would put them back in the melting pot.

The Flowers report recommended the closures or merger of seven London medical schools. The AUT says there are huge gaps in the report and they are unhappy about scale and timetabling of the proposals.

A spokesman said: "We are unhappy about the way they are tackling it. To force things through by the summer, as they are proposing, is unrealistic. They want the whole reorganization to have been completed within five years. We say they should set aside that period of time just for consultation.

"We do not think the savings they claim would be made can be substantiated. No real account has been taken of the cost of relocating institutions. We are concerned about the independence of institutions in London and the fact that the university should not promulgate close schools without consent."

The AUT wants to know the cost of rehousing institutions and staff at each of the expanded six schools of medicine and dentistry, the estimated value of buildings which would become vacant and whether the sums of money would accrue to the university.

A spokesman for the university said the report was still in the consultative stage. Members of the joint planning committee were still visiting institutions to discuss the measures.

Lack of offer angers staff

Polytechnic and college lecturers were shocked and angry this week at a refusal of the Burnham Further Education Committee to make an offer on their 1980 pay claim because of the impasse reached in the primary and secondary school teacher negotiations.

The management panel said that because of the position on school teachers' pay, where there is a dispute over whether salary awards should be linked with conditions of service, they had to delay making an offer.

Mr Peter Dawson, general secretary of the National Association of Teachers in Further and Higher Education, said: "We spoke against this in the strongest possible terms. We said it was completely unacceptable, there is no similarity between the dispute in primary and secondary negotiations and our claim."

There will be another meeting on May 8 when the management is expected to be able to make an offer.

"Agreement was reached on the Clegg recommendations affecting *research staff* but the positions of Lecturer IIs and part-time staff are still outstanding. The new rates will be paid in two stages, half from January 1, the rest from September 1.

The biggest stumbling block was the issue of part-time teachers.

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Rent allowance may cost millions

by John O'Leary

The introduction of a standard rent allowance to encourage more students to live at home could cost millions of pounds instead of saving taxpayer's money, the Department of Education and Science has warned MPs.

In a memorandum to the Public Accounts Committee, the DES analyses the means and costs of operating such a system and comes down firmly against change. The exercise was carried out in response to a request from the committee of backbench MPs in 1978.

Then, the PAC rejected the department's judgment that significant regionalization of university intake was not practicable and suggested the introduction of a new allowance for home-based students as an incentive against leaving home to study. Its members foresaw new expenditure of up to £100m on student accommodation by 1981-82 unless living at home became more popular.

In its response, the DES assumes that such an allowance would be paid at a standard rate but means tested as grants are at present. The allowance could be paid by increasing the home rate of grant, by cutting the amount of parental contribution, or by making payments direct to the student or his or her parents.

However, the DES points out that the allowance would have to be paid to the thousands of students already living at home as well as those switching from other accommodation. Even if the allowance was only £100, this would produce a "dendweight" cost of about £7m to be deducted from any savings produced. At £275 (the current difference between the home and away rates of grant) this could rise to as much as £22m, the report says.

As a result, the DES believes, more than 15,000 students would have to switch to living at home for the allowance even to break even at £100, while up to 135,000 would be needed if it was worth £275. The maximum saving per student would be £490.

The DES points out that, although savings would be greater if the allowance was paid at the lower rate, the incentive would be decreased and the number of "switchers" presumably reduced. "How many students would be switchers as a particular standard rent allowance is impossible to calculate but, in the department's view, the numbers of switchers required to break even under any of the schemes are so large as to be unlikely of achievement", the memorandum concludes.

NUS demands education for all 16-19 year olds

by Paul Flather

Comprehensive and planned education and training should be provided for all 16 to 19 year olds whether they are in school, further education, part time education, employed or unemployed, the National Union of Students told peers this week.

The NUS has submitted written evidence to the House of Lords Select Committee on unemployment calling for a planned approach to combat increasing youth unemployment.

The union says it does not expect a quick and simple resolution, but it urges the Government to make a long-term commitment to full employment and to pour more resources into training and education.

In line with its conference decision to lobby on areas of special expertise and concern to students, the NUS submission concentrates on youth unemployment and graduate unemployment, two of the worst hit groups in recent years.

The rate of unemployment among 20- to 24-year-olds has risen the most: while 5.2 per cent of the total in this age group were unemployed in July 1975, the figure had risen to 9.5 per cent in January 1978. From 1973 to 1980 those aged under 19 and unemployed had doubled to 240,300.

A one per cent increase in the overall rate of unemployment produces a corresponding increase of 1.7 per cent in unemployed males under 20, and an increase of 3 per cent in unemployed females under 20.

Unemployment among students on non-vocational courses is highest of all, said the NUS: 38 per cent of polytechnic arts graduates were still unemployed six months after leaving college.

Young people in the immediately post-school age group thus find themselves in a position where their competitiveness in the labour market is being constantly squeezed. At the same time, a large number found that they lack the skills and abilities to improve their competitiveness."

The union also draws attention to long-term unemployment: the number aged under 20 unemployed for 26 weeks or more rose by 59 per cent between 1976 and 1980, from 31,697 to 50,295.

The NUS suggested a strategic approach, which included:

- Comprehensive coverage: all young people to be given specific education and training, lasting for two years and equivalent to at least one working day a week.
- Comprehensive planning: the divide between education and training to be abolished; mandatory grants for all students, and new co-ordinating structures to be set up at the local level.
- Relevant content: the curricula of 16-19 provision meet specific job needs, provide work skills, and be kept flexible enough to meet varying demands of young people.
- Skilled labour: an extension of the Finnistan model to other areas of shortage.

The NUS supported the special temporary employment programme and the Youth Opportunities Programme introduced by the Manpower Services Commission but called for more resources to be diverted to the MSC. "This country cannot afford to mortgage its future in order, supposedly, to solve problems in the short term."

The NUS deplored the apparent indifference of the Government to rising unemployment and described as fallacious the argument that a period of austerity and cutbacks were necessary for future prosperity. More resources are needed, particularly in a time of great technological change, said the NUS.

UGC asked to reconsider

Essex University is to ask the University Grants Committee to reconsider its ruling that nurseries should not be subsidised.

Universities have three months in which to comply with a UGC letter which said that subsidies to nurseries or creches from recurrent grant income must cease.

Essex University spends about £4,000 a year from recurrent income to heat and maintain the day nursery building. The introduction of a new fees structure last year, including a hardship fund, has made it otherwise self-sufficient.

The university is concerned about the effect of the UGC directive on the nursery and is to ask the UGC to reconsider. The university feels it should be allowed to pay the maintenance costs of the nursery in the way it maintains other buildings.

The Equal Opportunities Commission, which criticised the UGC view, has the grounds that it would seriously undermine educational and employment opportunities for women, is considering whether to take the matter further.

Two members of the cast of Noonday Demons, one of eight plays from the National Student Drama Festival being presented this week and next at the Old Vic. This one is contributed by Grey College, Durham University, and won awards for sound and make-up at the festival in Southampton last month.

Other groups appearing in this fortnight's season are the National Student Theatre Company, Bretton Hall College, the Royal Scottish Academy of Music and Drama, York University Dramatic Society, and the Dragon Theatre Company from the Welsh College of Music and Drama.

Backing for Moscow physicist

British mathematicians at a symposium at the Open University in Milton Keynes last week expressed solidarity with disgraced Moscow physicist Professor Naum Meiman.

Professor Meiman has been prevented from taking up a visiting chair at the Open University because the Russians refuse to grant him an exit visa. The authorities have refused to let him leave ever since he applied to emigrate to Israel in 1975.

Earlier two Open University mathematicians, Professor Roger Penrose and Dr Dan Dubin, flew to Moscow to attend an international three-day conference which was not recognized by the authorities.

The conference on collective phenomena was the fourth to be held annually in the flat of the Russian academic Victor Brailovsky.

About 40 mathematicians and physicists—including 20 from the West—crammed into the small rooms to hear papers given by Professor Meiman and other eminent scientists. Disgraced Nobel-prize winner Andrei Sakarov, who attended last year's conference, sent a paper from exile in Gorky.

The annual conference in Moscow is the culmination of weekly seminars held in Victor Brailovsky's flat. Similar unofficial seminars are held weekly in the field of mathematics and physics in Leningrad and Riga.

Enrolments fall at NUU

Efforts by the New University of Ulster to expand student numbers have suffered another setback. The latest report of vice-chancellor Dr William Cockcroft, shows that full time enrolments in 1978-79 fell by 51, on top of a drop of 13 the year before.

Numbers peaked at 1,757 in 1976-77 but fell in the following years to 1,744 and 1,693. The drop of 64 represents 3.6 per cent over the two years. It seems to have embarrassed the university because the vice-chancellor's report departs from former practice by dropping all reference to previous enrolments.

In line with Government policy, the worst hit area is education, where full-time numbers fell by 40 in 1978-79. Despite this, it remains the largest school in the university, with 498 students. However, its staff-student ratio of one to 14.6 compares poorly with the average of one to 7.8.

Enrolments fell in all schools apart from social sciences where there was a rise of 53. Physical sciences went down by 10, biological and environmental sciences by 15 and humanities by 26. There was also a drop of 13 at the Institute of Continuing Education at the university's Derry campus.

SRC welcomes idea of development council

by Robin McKie
Science Correspondent

The idea of an engineering design and development council which is proposed in the Finniston report on the engineering profession has been welcomed by the Science Research Council.

In its response to Finniston, the SRC states that such a body would reduce the present multitude of existing funding agencies which support engineering research and its industrial developments. The number of present organizations only confuses industry and creates problems for the SRC in its attempts to promote industrial work.

"However, the SRC opposes the creation of a new body merely to oversee the existing agencies concerned with development funding", the response document warns. "It must replace them, or at the very least weld them into a single effective instrument for developing support."

The SRC welcomes the Finniston report, although several criticisms are highlighted in its response to the Department of Industry on the main proposals. The main facts are that:

- The vital part of science and mathematics in engineering has been underplayed;
- Too little attention has been given to updating and re-educating existing engineers;
- No reference was made to reforming technical engineering education.

The SRC also states that it has greatly increased its support of engineering research over the past few years and is intending to change its name to the Science and Engineering Research Council. The Department of Education and Science has been asked to approach the Privy Council to make such a change.

This would have the added benefit of indicating to engineering firms that the council was a major body which supported engineering research and education.

Students stage protest

Three student presidents from Scotland's education colleges have handed in to education undersecretary Mr Alex Fletcher petitions with more than 10,000 signatures calling for increased teacher training and guarantees of the continued maintenance of the 10 colleges.

More than half the signatories were students' parents.

The presidents of Craigie, Callendar Park and Moray House colleges met briefly with Mr Fletcher's private secretary. Craigie and Callendar Park, with proposed intakes next year of 70 and 65 respectively, are two of those lying under threat of closure, although Scottish Secretary Mr George Younger has said he envisages no closures next session.

The Scottish Office was simultaneously being picketed by around 200 college students, who were angered by Mr Fletcher's refusal to meet students who wished to discuss with the minister the current and proposed levels of student intake and the future of the colleges.

Ms Jeane Freeman, chairperson of the Scottish National Union of Students, commented: "I am amazed at the gall of any government which refuses to meet with, or even listen to, such a large group of people. Past governments also thought they could ignore student opinion, particularly on this question. We proved them wrong, and I had hoped Mr Fletcher would have learned from the mistakes of his predecessors.

"We are talking about the future of Scottish education where it matters most—in the schools.

Plea for race question

A question on race or ethnic identity should still be included in the 1981 Census, the Social Research Association says in a letter to MPs who were debating the Census Order in Parliament this week.

"Without a race question in the Census, we shall have no reliable information about how racial minorities are faring relative to the rest of the population in crucial areas of housing and employment, for example", the letter says.

This will lead to less informed policies, and problems in monitoring their impact on racial minorities, claims the SRA, a professional body of 700 researchers in government, higher education and independent institutes.

A major reason given by Mr Patrick Jenkin, the Secretary of State for Social Services, for dropping the race question was his response to the test question in Haringey in April 1978.

The SRA says: "The form of the race question tested in Haringey was the worst of any set officially proposed. And the test itself was conducted just before the last election when there were fears about new race laws.

"In the circumstances the response rate to the race question was high, not low. We do not believe that a redesigned question, accompanied by a full explanation and assurances would jeopardise the census itself."

Medical researchers demand better deal

by Robin McKie
Science correspondent

Medical researchers in Britain should be employed on a permanent basis at universities and be relocated within departments according to the needs of different projects, the Association of Researchers in Medical Sciences proposed this week.

The group also recommended that the standards and training of these researchers should be regulated by a new professional body, the Institute of Professional Researchers.

Details of the schemes were outlined at the launch of ARMS' report—*The Case for Careers in Medical Sciences*. This points out that more than £80m is spent each year on medical research at universities and medical schools, involving between 4-5,000 scientists who are employed on fixed term contracts lasting on average only two and a half years.

Recent funding difficulties among universities and research councils, who pay higher education centres to employ researchers, meant that many senior and important workers were being refused further grants and appointments because their age made them too expensive to support.

Researchers were also being pressured and threatened into signing waiver clauses which removed their rights to receive redundancy payments and other employment benefits.

Dr John Dickinson, chairman of ARMS, described the present contract system of deploying researchers as being in a "chronic degenerative condition".

The weakness lay not in a lack of funding, but in the manner of its allocation. The present method of providing universities with money to employ researchers for a fixed period was grossly inefficient given the continuous nature of research work.

"Instead, there should be a cadre of re-locatable researchers which should be created at universities", he said. These could be moved from one project to another as needs altered, although such a system would have to be introduced gradually so that the present age stagnation problem which already affects university departments was not made worse.

This method would have the added advantage of allowing researchers to bring ideas developed in one area of medical science across into another area.

Professor Stewart Cameron, of Guy's Hospital, London, said that apart from the inhumanity of the system, it was also grossly inefficient. "Instead of setting up a cadre of professional researchers, we are moving towards having an impermanent group of junior workers", he added.

"Britain has the best clinical research work in the world but this is threatened by a lack of permanent researchers."

Dr Anne Simmonds, an ARMS committee member, said first class people were being handed out third-class treatment.

"The trouble is that control is in the hands of the those least qualified to use it—administrators. They are abusing the system by squeezing out young talent and dumping them on the dole queue."

She accused universities of bullying and of acting in a Dickensian fashion. "They recently scrapped fagging at Eton, it's time they did the same at universities", she said.

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Ministries start talks on break-up of ILEA

Ministers hope to decide before Parliament's summer recess whether to break up the Inner London Education Authority.

A preliminary meeting of officials from a number of Whitehall departments has already taken place and a study group set up by Mr Mark Carlisle, Secretary of State for Education, is expected to have its first meeting next week. It will be chaired by Baroness Young, Minister of State for Education.

Mr Carlisle announced the inquiry in a Commons reply to Mr Kenneth Baker, Conservative MP for Westminster St Marylebone, whose report on the ILEA recommended its abolition. Mr Carlisle said the Government had embarked upon "a comprehensive examination of the local government arrangements for the provision, administration and financing of education in Inner London".

The group carrying out the study will consist of ministers from the Departments of Education and the Environment, the Treasury and probably the Home Office and the Department of Employment.

Two of the 13 authorities comprising the ILEA (Wandsworth and Westminster) have already told the Government they would prefer to administer their own education but none has yet been asked to present evidence to the new group.

Since Mr Baker's committee of Conservative MPs and the two Conservative-controlled boroughs are all highly critical of the ILEA, which is solidly in Labour hands, there will be pressure on the study group to recommend a break-up.

The Baker report touched on higher education only briefly, calling for administration of the five inner London polytechnics and other colleges by joint education committees. The directors and governors of the polytechnics subsequently wrote to Mr Carlisle supporting the ILEA.

Colleges still negotiating as FE sector takes 18.2 per cent

by Olga Wojtas
Scottish correspondent

The Scottish Teachers' Salaries Committee has reached a settlement in its negotiations to implement the Clegg Commission report, with an 18.2 per cent award across the board for the further education sector.

Schoolteachers have received awards spread across the percentage increase pattern recommended by Clegg, with an additional amount to get rid of the "primary anomaly" where Scottish primary teachers were paid very much less than their English counterparts.

Mr David Bleiman, secretary of the Scottish Further Education Association, said: "Our expectation had been that the settlement would be based on the percentages recommended by Clegg. This seemed the logical approach, but we were quite happy to accept 18.2 per cent across the board in order to achieve a speedy settlement."

The negotiations to adapt the Clegg report for Scotland have taken two weeks. Professor Clegg anticipated the process would take six months.

The 18.2 per cent settlement was urged by the Educational Institute of Scotland, Scotland's largest teaching union, which dominates the STSC. Mr Arthur Houston, further education spokesman of the EIS, said this was the fairest solution as, generally speaking, those in top positions in Scottish further education were more highly paid than their English counterparts, and those at the lower end of the scale paid less.

The central institutions and colleges of education, both of which have separate negotiating structures, and have still to meet to discuss Clegg, are expected to seek straightforward translation of the Clegg percentages into Scottish terms.

Now that the 1979 award has been settled, the STSC is meeting next week to discuss this year's award.

The management side has offered 13 per cent over and above Clegg, which is in excess of the offer in England and Wales, but this has been rejected by the teaching side.

There has been a suggestion that the management will propose a reduction of staffing levels during negotiations.

The SFEA and EIS have stated their firm rejection of any such proposals.

DES approval exercise 'could threaten courses'

by Patricia Santinelli

Several higher education courses in engineering and mathematics might collapse as a result of the Department of Education and Science's exercise on course approval, a discussion paper issued by the teacher education section of the National Union of Students shows.

The paper says it is clear that the circular issued by the DES under Further Education Regulations 1975 aims to cut courses which are under recruiting. "This would sound the death knell for many courses and colleges which are expecting recruitment problems arising out of the increase in overseas students' fees", it says.

For example, this would affect HND courses in engineering, mathematics and measurement control where the minimum enrolment is set at 24 and there are only 13 possible home students. Also at risk are BSc courses in industrial engineering and mathematics where minimum enrolment is set at 48 and 36 but for which again the possible number of home students is much lower.

Another study carried out by the Teacher Education National Committee shows exactly what can happen to colleges through lack of government policy on the supply and training of teachers and "inspired" teacher unemployment, both of which have "created" fallbacks which have forced some students to provide funds themselves to complete their teaching practice, especially where equipment grants have been dropped.

Recruitment to three and four year teacher education courses has fallen by almost 30 per cent between March, 1979, and March, 1980.

Mr David Aaronovitch, president-elect of the NUS, said at a one-day conference in London last week, that "actual and active pressure" had to be put on local authorities and the government to keep up teacher recruitment.

The NUS is urging all teachers to press for equipment grants for which they are entitled, and to follow the principles of a charter on teaching practice.

The study picked Manor House, which is Battersea College of Education merged with South Bank Polytechnic. Here, although the DES allocates 60 home economics BEd places a year, this year only 35 students enrolled on the first year.

Registers of unemployed teachers drawn in all local authority areas are to be used by the National Union of Students as part of a new campaign to highlight cutbacks in teacher education and employment, writes Paul Flather.

The registers will be used to "embarrass" those authorities who refuse to employ newly qualified teachers or who argue that there are a shortage of suitable applicants.

The NUS is also protesting at cut-

The first major exhibition in Britain of the work of Salvador Dali opens on 14 May at the Tate Gallery in London. The exhibition, which includes more than 300 paintings, drawings and surrealist objects, was first shown at the Pompidou Centre in Paris.

Deadlock on May Day working

For the third year running, further education lecturers will have to make up the day "lost" by the May Day bank holiday, which falls on Monday.

There are no signs of an end to the deadlock between local authority employers and the unions which has effectively denied lecturers the extra bank holiday introduced by the last Labour Government.

The holiday was inaugurated after the agreement on conditions of service was signed, and the employers, who already regard the teaching year as short (36 weeks) are opposed to conceding a further holiday.

The National Association of Teachers in Further and Higher Education feels that lecturers should not have to work a day in lieu of what is a national holiday.

After repeated national attempts to find a solution failed Salford Council has called on the Council of Local Education Authorities to have one more try at finding a solution.

CLEA's view is that the proper place to resolve the conflict is the new national joint council on conditions of service. But in view of the solid opposition from employers, it is highly unlikely to appear on the agenda at the council's next meeting early in June.

Most education authorities appear to follow CLEA policy and require lecturers to work an extra day.

SSRC chief angry over discourtesy

The chairman of the Social Science Research Council Mr Michael Posner has written to the president of the British Sociological Association complaining about the "discourteous" way in which he was treated at a recent BSA conference.

Mr Posner is objecting in particular to remarks made about the SSRC by BSA president Professor John Eldridge, of Glasgow University, in his opening address to the 30th annual conference at Lancaster University.

Before the conference and invited guests, who included Mr Posner, Professor Eldridge accused the SSRC of suffering from "indifferent leadership" and of succumbing to Government interference.

He said the council had lost its way, was wracked with internal problems, a demoralised staff and was facing pressure from successive governments to justify itself. He further attacked the scaledown of the proportion of funds for the allocation of postgraduate studentships.

In a personal letter to Professor Eldridge, Mr Posner says he considers the remarks regrettable and offensive. As an invited guest he should have been warned in advance that his organization was going to be attacked in such a manner.

Furthermore, even if the criticisms were warranted, the BSA president should be asking what good this approach does to the cause of sociology, the letter adds.

Professor Eldridge remains unrepentant, and he will be writing back to Mr Posner to say so. "My comments were perfectly in order", he said. "What I argued for in my address and still continue to argue for is reform of the council and I think that is a very fair comment."

Professor Eldridge who is a former chairman of the SSRC's management and industrial relations committee and a member of its North Sea oil panel, added: "I want it improved and to become a better organization. I want it standing up and fighting a bit and not being as weak as it has been in the past."

Ethnic study courses called for

All teacher-training courses should contain a compulsory element of multi-cultural studies, the leading lecturers' union advocated this week in its evidence to the Committee of Inquiry into the education of children from ethnic minority groups.

The National Association of Teachers in Further and Higher Education says that the development of further education training courses, the one-year postgraduate certificate of education and in-service courses are crucial targets for improvement.

The association wants to see more black teachers in schools and recommends the provision of adequate preliminary courses to facilitate recruitment. It believes the careers service should try to attract people from minorities.

Further education colleges, too, should become more informed about the wide range of culture and communities that exist and reflect this in the ethos of the college.

Micro-electronics centre set up

Scottish Secretary Mr George Younger has ended speculation by announcing that the proposed educational development centre in micro-electronics, backed by a Scottish Office grant, is to be established at Paisley College of Technology.

However, as yet no figures are available as to how much the grant will be, and it is still not known where the complementary micro-electronics application centre, which will promote the application of micro-electronics systems in Scottish industry and commerce, will be based.

Wood carvings from the Yugoslav republic of Macedonia are going on display at an exhibition which opens tomorrow at the Horniman Museum in London. The exhibition, which includes several rare medieval pieces, is being staged under the auspices of the Yugoslav-British cultural exchange programme. It closes on August 31.

Careers service warns against move toward vocational courses

by John O'Leary

Current manpower shortages in mathematics and the sciences should not result in a move away from broadly based first degrees towards more vocational courses, careers officers have told the Select Committee on Education.

The Association of Graduate Careers Advisory Services, in a written submission, advocates instead a continuation of the present pattern of undergraduate courses with only a marginal increase in places in the sciences. This should be backed up by a "properly planned and funded system of postgraduate vocational training and education".

Creating more places in the shortage subjects would not of itself attract sufficient graduates of quality, the careers officers say. But measures must be taken to increase the supply of engineers, physical scientists and generally numerate graduates.

Many employers now recruit mathematics and physics graduates simply because they are known to be numerate, AGCAS believes. Shortages could be eased, therefore, if institutions of higher education improved the numeracy of students in all subjects to approximately A level standard, thus reassuring future employers.

"The real demand is for people with a broad, flexible education, with basic skills of numeracy and literacy and with mature personalities, who can acquire the necessary purely vocational skills through intensive postgraduate education and training", the AGCAS submission says. "In at least one third of new graduate vacancies, general academic ability and personality are the only requirements."

The development of vocational first degrees, especially those providing the prerequisite for entry to a particular profession, would have the added disadvantage of creating expectations in students which might not be fulfilled, they say.

However, the careers officers see a complementary system of vocational postgraduate training as vital if shortages are to be combatted. At present, where conversion courses exist, grants are difficult to obtain and, because of their status as discretionary for grant purposes, many anomalies exist.

Oxbridge degrees still an asset

Graduates from Oxford and Cambridge are still in great demand despite rising unemployment in recent years, according to the annual reports of the two universities' appointments boards.

Less than four per cent of Oxford graduates remained without a job six months after graduating in 1979, almost one per cent below the national average. It was a better figure although it represented some hardening of the recruitment market, says the report.

The Cambridge report comments on the continuing high demand for graduates. "There is, as always, a wealth of opportunities for those who combine good brains with evidence of achievement outside the purely academic sphere", it says.

Almost one-fifth of Oxbridge graduates still go on to do further research, a figure far higher than the national average of about 11 per cent. Mr Tom Snow, the secretary of the Oxford University Appointments Committee, said this was expected from universities with high academic records.

Both universities report a strong demand for graduates entering industry. The number of Oxford students entering commerce, industry, and accountancy, was slightly above the national average. Prospects for chemists and chemical engineers are good but Cambridge notes a shortage of mechanical and electrical engineers. The demand for people to work with computers is high.

Almost 5,200 students, a record number, contacted the Oxford Appointments Board during its 1978-79 academic year, almost 8 per cent of all first degree graduates. In 1970 about 60 per cent contacted the board.

Both universities are now running series of careers' talks, and short management and training courses. At Oxford 300 students attended a lecture on interviewing techniques. Talks on Marriage and Career have been run for the past two years. A talk called "Are Opportunities Equal at Oxford?" was attended by just two students and is not to be repeated.

Lord Perry leaves OU his blueprint for the decade

by Charlotte Barry

A "grand design" for the 1980s aimed at increasing the efficiency of the Open University and eliminating unnecessary expenditure has been presented to the Senate by the retiring vice-chancellor, Lord Perry.

The discussion paper, which has been referred to the university's standing committee for action, was commissioned by the OU council, senate and finance committee.

The proposals include abolishing the educational studies faculty, expanding the continuing education division and strengthening academic research.

The paper assumes that the number of undergraduate students will expand from the present 61,000 to 71,000 during the next decade. The number of associate students will grow from 7,000 to 10,000.

However, the biggest expansion will be in continuing education which will leap from the present 13,000 students to 120,000 in 1990. By that period, there will be 70 courses, equivalent to 25 full credit courses.

In making these proposals Lord Perry questions the absolute priority given during the first 10 years of the Open University to the undergraduate programme.

"In view of the obvious fact that for the next few years in any case the only potential new government money will be directed towards continuing education, for technology and science, I believe the Open University would be politically wise to couple this area of development on a par with completion of the undergraduate programme as first priorities", he says.

Lord Perry also advocates the creation of a new Institute of Education from the in-service teacher training unit in the continuing education division and the educational studies faculty, which should close. Educational psychology and educational sociology would be incorporated into the social sciences faculty.

As much of the need for retraining or updating teachers is subject-based, the new institute of education should call in academics from other faculties to mount courses in specific subjects.

Lord Perry also wants to abolish the central regional tutorial services department and amalgamate the posts of senior counsellor and senior tutor into the single new post of senior tutor.

He recommends the setting up of a new research and development division which would include all institutional research and postgraduate student administration.

Lord Perry urges the senate to examine the BBC bill with great care. "We should not rush in and eliminate broadcasting as an unnecessary luxury", he said.

● The acting vice-chancellor of the Open University from June to December will be Professor Godfrey Vesey, who is head of the special university courses area and professor of philosophy.

Professor Vesey takes up his duties on June 23 when the founding vice-chancellor, Lord Perry, goes on study leave prior to his retirement. The new vice-chancellor, Professor John Horlock, takes over in January 1981.

Micro course for UMIST

The first of the SRC's £1.4m programme of new MSc courses in microelectronics design is to be set up at the University of Manchester Institute of Science and Technology.

Two other courses—which are being established as part of the council's £9m commitment to implementing the Roberts' report recommendations on improving Britain's microelectronics capability—are to be launched at Edinburgh and Southampton universities. The SRC is also considering several other higher education centres which could be the sites of two or three other MSc courses which are to be set up.

A total of £250,000 is to be spent on the UMIST programme and this money will help pay for two new members of staff, improve facilities at the department of electrical engineering and electronics, and finance new software systems.

Students will work in close collaboration with local companies, including Ferranti and ICL, which will manufacture components for their projects that will range from device fabrication to integrated microelectronic component design.

Dr A. E. Erthymiadis, of the department, said students would be taught not just how microelectronics components were constructed but how they would be used within advanced electronics systems.

The course on integrated circuit system design will be supported by two other UMIST departments—computation and management sciences—and will include lectures on solid state technology, digital system design and implementation, software engineering and project planning.

Posts frozen as cuts hit poly libraries

Polytechnic libraries' budgets have been badly hit by the capping of the advanced further education pool for 1980-81, a preliminary survey has revealed.

The survey undertaken by the Council of Polytechnic Libraries has so far collected information from some 13 out of 15 polytechnics which shows that libraries have suffered substantial reductions in their book funds, staffing and in some cases equipment funds and building projects.

The worst affected are Huddersfield and Manchester Polytechnics which have had cuts of £125,000 each followed by Liverpool with a £30,000 cut. Central London with a 15 per cent reduction and Middlesex with an £18,500 cut.

Hatfield, Liverpool, Manchester, Middlesex and Leicester Polytechnics have had to freeze vacancies and postpone filling new posts. Plymouth Polytechnic is cutting equipment by 35 per cent and practically five serials subscriptions have been dropped at Birmingham Polytechnic.

The five polytechnics within the Inner London Education Authority have been sheltered from the direct effects of capping the pool and have the ability within the block grant system of filling vacancies at the expense of the book fund and vice versa.

COPOL points out that the biggest danger is that the libraries book funds represent the larger element of non-committed expenditure and therefore library budgets and staffing are bound to suffer disproportionately when local education authorities are seeking reductions.

It says the council should seek to influence the study group on the management of the pool set up by the Department of Education and Science to investigate unit costs in APE. It should prepare and offer evidence to the group so as to ensure reasonable support for libraries and be a recognizable entity when documents and reports are produced.

Women scientists call for changes

by Pat Smith

Government programmes aimed at enticing more young women into science and technology are likely to prove unsuccessful if they are geared to turning out carbon copies of the average male scientist, according to women in BSSRS, the British Society for Social Responsibility in Science at a conference in London last week.

Sex stereotyping at an early age means that a more radical approach to the teaching of science and greater integration of ethical questions was needed to encourage women into the field, delegates heard. But once there they would effect their own changes in the profession. The conference, held at Imperial College, was entitled "Why Are Science and Technology Important to the Women's Movement?".

Ms Marianne Craig, scientific author and a member of BSSRS' business group, said: "We do not want to see more women if it is simply to work on military technology or nuclear power. The more we push for women in science implies it is neutral and we want to go beyond that, but if more girls enter involved perhaps we can change its values."

"People associate technology with progress, but much of new technology, particularly VDUs being introduced into offices, have been deliberately programmed to control people. Women have already successfully taken on one branch of science, the medical profession, to gain control by forming their own self-help groups and spreading information", she said.

The conference was attended by about 200 women from all over the country. It attracted a large number of specialist, therapists of whom complained of their isolation since college in industry and research, partly because of the nature of their work but also because of the lack of support they received.

The uninspiring way people were introduced to science and technology and the burden put in front of any girl choosing a science career came under heavy attack.

"Many young women are made to feel alienated, scared and ignorant about science and technology, and yet every day at home, school, work and shopping they confront and consume it," said Ms Craig.

In a workshop on science education Ms Mary Attenborough of Imperial College said that until women's right to a career was accepted, science would continue to be dominated by men and women discouraged. In schools science was treated as a career-oriented subject, portrayed as "objective, rational and logical" and inherently masculine, at a time when the social pressures on young women to be "feminine" implying "caring, subjective and emotional", were at their strongest.

It was presented as a way of gaining control and power over nature but few pupils were taught the social consequences of scientific and technological developments. The competitive, noncooperative nature of the work and examinations were off putting to both boys and girls but boys were more likely to stick to it because of careers.

Early specialization with the strict separation of arts and science and the lack of confidence many girls experienced after puberty were also cited as barriers to women. Women who had pursued scientific careers complained they were still sex-stereotyped. Employers frequently questioned their commitment if a family was planned.

"When men did army call-up there was no question of interrupting careers, why then should women not be expected to cope with childbirth?", asked Kate Hinton, a North London school teacher.

Other sessions at the conference included new technology communication, drug misuse, domestic technology, nuclear power and biological theories of women.

Councils urged to examine staffing

Local education authorities and colleges should urgently examine the whole issue of selection and training of further education staff on the Youth Opportunities Programme, the Manpower Services Commission advocated last week.

Mr Alistair Robertson, principal trainee adviser to the MSC Special Programmes Division speaking at the first of a series of regional conferences in London on the contribution of further education to YOP said that the very fast development of the programme allied to pressure on finances and resources had resulted in a very high proportion of part-time staff being employed on YOP.

"So far very little effort has been made to deal with the implications of this", Mr Robertson said. "The solution does not lie in isolated one-off initiatives lasting half-a-day or three weeks but in a comprehensive programme tackling the whole area".

Mr Robertson said that the percentage contribution made by the further education service towards YOP had increased considerably since the first year of the programme. But there had been considerable variation in the response of individual LEAs and colleges within these authorities. This variation applied equally to the number of young people from each of the elements within YOP who had obtained benefit from the further education input.

"From national statistics it is clear that trainees in training workshops, community service and project based schemes have taken a much greater advantage of further education opportunities than those who are on schemes run by employers", Mr Robertson said.

The conferences which are jointly organized by the MSC, the National Association of Teachers in Further and Higher Education and supported by the Department of Education and Science and the local authorities associations will run in different regions of Britain until May 20.

North American News

Medical schools fight for funds

from Clive Cookson
WASHINGTON

This year the Health professions' Educational Assistance Act—the main vehicle for United States government support of medical education—is up for its four-yearly renewal by Congress. The timing is unfortunate for the medical schools, not only because politicians are in a cost-cutting mood but also because many medical manpower projections are now forecasting a surplus of doctors by the end of the 1980s.

Two new reports have just been published, one by the federal Department of Health, Education and Welfare (HEW) and the other by the Office of Technology Assessment (OTA), a body set up by Congress to make independent analyses of scientific and technical issues. Both say that supply of active physicians in the United States will reach about 600,000 by 1990, compared to 323,000 in 1970 and 379,000 in 1978.

The reports agree that this total would be more than the country needs, but not by how much. The HEW document predicts a "requirement" for somewhere between 553,000 and 596,000 doctors in 1990, with the most likely surplus being 25,000.

The office of technology assessment report challenges HEW's assumption that the demand for physicians' services will go on if there is no increase in the requirement for physicians' services over the coming decade. Apart from changes in demand caused by demographic factors the surplus in 1990 would be 185,000, the report says.

It is extremely difficult to define, let alone predict, "requirements" for physicians, and the OTA points out that "if it is considered desirable for use to rise, for physicians to spend a few extra minutes with each patient, or for physicians to have shorter workweeks", much of the 185,000 surplus would disappear.

Many of the politicians who are currently holding congressional hearings on the reauthorization of the Health Professions' Educational Assistance Act seem to be taking note of the manpower forecasts, and medical school representatives are having a hard time persuading them to maintain federal support for the education and training of doctors and other health professionals close to the present total of $500m a year.

The Carter administration wants to put an immediate end to the "capitation grants" by which the government pays medical schools more than a $1,000 per student enrolled. These grants were introduced several years ago when there was a shortage of doctors, as an incentive for schools to expand.

The administration is urging Congress to go further and stop all other forms of institutional aid to medical schools and to colleges training other health professionals. Instead it wants to spend money on scholarship programmes, such as the National Health Service Corps, which give grants to students who are prepared to work in poor areas where health services are substandard, or in primary care where there is still arguably a shortage of practitioners. President Carter also wants to continue scholarships to attract more members of minority groups into the medical profession.

Trainee doctors could be priced out of medicine if the government cuts aid.

Most medical school administrators accept the fact that Congress is going to phase out capitation grants. But they argue forcefully that some form of institutional support for medical schools must be maintained.

William Danforth, who is chancellor of Washington University in St Louis and one of the best spokesmen for American medical education, has been trying to persuade Congress to adopt a new two-tier system of institutional support. Schools would get a basic grant, at least matching the federal funds they received in 1979, and additional support if they undertake programmes that meet national needs, such as training large numbers of minority students or primary care practitioners.

One of the reauthorization bills that is currently before the Senate, introduced by Edward Kennedy, would meet some of these objectives, though it would not provide as much money as the medical schools think they need.

The intake of new students by the United States' 126 medical schools was a record 16,930 in 1979-80, up 2.4 per cent over last year. Total enrolments reached 63,800. The number of applicants has fallen a bit from its mid-1970s peak, but it is more than double the number of places available, and most schools still turn away many qualified students.

Supporters of continued federal support for medical schools argue that if the aid were stopped, tuition fees would soar even faster than they are already doing and poorer students would be priced out of medicine. Even today a student might have to borrow $50,000 to pay for four years at the most expensive private medical schools.

Ethics teaching survey poses moral dilemma

As many European visitors have remarked, the United States takes ethics and public morality—or at least their outward manifestations, much more seriously than their own countries. Americans love to think of themselves as a more moral people than almost any other, and they noted with some satisfaction the surprised reaction abroad to the moral dimensions of the Vietnam and Watergate debates.

So it is no surprise that ethics teaching occupies a more important role in the American college curriculum than in European higher education. In all 11,000 to 12,000 courses in ethics are currently taught at the undergraduate and professional school levels in the United States.

That estimate comes from a major new study of the teaching of ethics, which is the first really comprehensive one ever taken. It was directed by Sissela Bok, an eminent medical ethicist from Harvard, and Daniel Callahan, director of the Hastings Centre, and was largely financed by a $200,000 grant from the Carnegie Corporation.

The Hastings Centre, known alternatively as the Institute of Society, Ethics and the Life Sciences, has pioneered new methods of ethics teaching, particularly in medical ethics or "bioethics", to use the new, wider term. So the centre, which is on the Hudson River upstream from New York, was a natural base for the project. Scores of academics in the field contributed papers and studies, and the final report consists of nine volumes. One is an overview of ethics teaching in higher education with recommendations. The other eight deal with particular areas, such as ethics in the undergraduate curriculum, ethics and engineering curricula, and so on. (They have just been published by the Hastings Centre. The first volume costs $5.)

The central conclusion of the study is that although ethics appears at first sight to be "sweeping the collegiate landscape", its adoption turns out on closer examination to have been patchy.

The authors of the report are great enthusiasts. They propose that the teaching of ethics be given a far more central role in the curriculum than it has had in recent decades". They recommend that every undergraduate should have a systematic introduction to both ethical theory and applied ethics: "The minimal standard ought to be that of a one-semester course, with other opportunities available for more advanced work in ethical theory or work in different areas of applied or professional ethics."

The goal is "an undergraduate who is alert and sensitive to moral problems, has an understanding of the nature and place of ethical theory, and who has been afforded an opportunity to confront issues in applied ethics in the classroom".

The most dramatic growth in ethics teaching in recent years has come in the professional schools, particularly in medical schools. Nearly all American medical schools now offer at least one course, or subsection of a course, devoted to the subject, according to the Hastings Centre, "although about half of the medical schools in this country still offer very little in the way of systematic training in ethics".

Ethics teaching at medical school has been much helped by the fact that in the United States medical ethics and bioethics are becoming a major scholarly field in their own right, offered as specialized graduate programmes by some universities.

In several other professional fields ethics is making headway, though the Hudson report complains that the subject still has very low status in the curriculum of most schools. Ethics teachers in professional schools are often handicapped by the lack of a coherent body of scholarly literature about ethics applied to their field.

In some areas, particularly business and journalism, there is plenty of writing about ethical issues, but it almost completely ignores contemporary work in philosophical and theological ethics.

Naturally the report recommends: "Every professional student should have a systematic exposure to the ethical problems of his or her chosen profession". The Hastings team rejects the frequent argument that ethics ought not to be taught in a specific course at all but should be built into all other courses in the curriculum—partly because that never works in practice, and partly because "an other serious subject is taught in the curriculum by what has been called the pervasive method, and ethics ought not to be the outcast".

The study found serious deficiencies in the quality as well as the quantity of ethics teaching in American higher education. The problem is that far too many courses in professional or applied ethics are taught by faculty members with almost no training in ethics—which horrifies the authors of the Hastings report. "No one can claim competence to teach ethics without some familiarity with the history, the modes of reasoning, and the concepts of moral philosophy or moral theology", the report said.

At the minimum, every academic from another field who teaches a course in applied or professional ethics should have a year's training in ethics, the report recommends. Such courses ought not to be introduced into the curriculum unless those proposing to teach them have the necessary training.

Michigan doctor claims monster maths breakthrough

from our North American Editor

Robert Griess of the University of Michigan has made a discovery of great significance for theoretical mathematics or at least he says he has.

In January he distributed a circular around the mathematical community, announcing that he had constructed a group known formally as F1, and informally as "the Monster" because it contains about a million million million million million million elements. (Groups are abstract mathematical structures. They consist of elements—potentially any sort of object—which can be combined under a specified operation according to certain rules. Group theory has become an extremely important part of modern mathematics and it is a useful tool on many scientific fields, particularly crystallography and spectroscopy.

Dr Griess's note revealed no details of his construction, beyond saying that it was "carried out entirely by hand", that is, not by computer, and "I like it". But he is a highly respected mathematician and he has been working on the Monster for several years, so his colleagues believed him and waited for him to publish his method in due course.

The announcement excited mathematicians for a number of reasons. First, it virtually completed a major international effort to classify groups. All finite simple groups are either members of two well-defined families or exceptions known as "sporadic" groups. Theoreticians believe 26 sporadic groups exist, and at the beginning of this year 24 had been constructed. One of the two remaining groups, J4, was produced in February (with the aid of a computer) by a British team at Cambridge University led by John Conway—and the last one is the Monster.

Second, the Monster is of great intrinsic interest. It is the largest sporadic group and its properties are connected in a way that is not yet understood to a completely different field of mathematics, analytical number theory. "I know of no development in mathematics in the past five years that is more exciting than this connection", said Alan Thaler, who directs the National Science Foundation's research programme in algebra and number theory.

Dr Griess, who is currently on sabbatical at Princeton's Institute for Advanced Study, told Dr Thaler of his success again without providing details, and the NSF put out an enthusiastic press release.

The May *Scientific American*, just published, also hails the construction of the Monster as a major mathematical advance. But the latest issue of *Science*, the prime scientific journal in the US takes a different line.

It contains an article critical of Dr Griess's refusal to tell anyone how he constructed the group or even when he will publish details of his method. The writer, Gina Kolata, points out that it is highly unusual for a scientist to be given credit for an important discovery simply on the basis of a note saying essentially "I did it and I like it", as Dr Griess has been.

It is not clear whether Dr Griess is withholding details because, to quote *Science*, "he is trying to milk his method as much as he can before he releases it to his competitors", or because he decided to announce his success before he had finished checking the proof, so as to establish priority. Perhaps he is just deriving arrogant pleasure from the impatience of his colleagues.

Most mathematicians working in group theory still expect Dr Griess to produce the goods eventually. "I really do trust him", says Dr Thaler at the NSF. But even if Dr Griess fails that on his face, one of his competitors or colleagues will probably construct the Monster before long.

Over the past few years, some of the most brilliant mathematicians in the United States, Britain and Germany have been working on the classification of groups, and their progress has been spectacular. They have apparently proved that any finite simple group must either belong to one of the established families or be one of the 26 sporadic groups, and it seems that all the remaining sporadics, which were quite unknown 15 years ago have been discovered.

A lot of loose ends need to be tied up, not least by Dr Griess. It is even conceivable that the theorists will turn out to be wrong and more sporadic groups will turn up. The only sad thing is that it is so hard to explain it to non-mathematicians.

Colleges get patent rights for research

The United States Senate has passed by 91 votes to four a Bill giving universities (and small businesses) automatic patents for discoveries made in the course of government-financed research. At present, title to the patent is normally held by the funding agency, unless the university negotiates a special arrangement.

University lobbyists were delighted by the size of the majority, which should give additional impetus to their drive to get the legislation through the House of Representatives. They argue that the Bill would provide more incentive for the exploitation of discoveries made through government research grants and contracts.

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Overseas News

Political war over defence forces academy

from Geoff Maslen

MELBOURNE

A war of words is being waged over a proposal to create Australia's 20th university—a defence forces academy.

The notion is under attack by academic critics who describe a military university as a contradiction in terms, and by federal government backbenchers who are angry that the government has ignored the findings of the powerful Public Works Committee which recommended the idea be dropped.

It is certainly one of the more expensive and controversial schemes put forward by the Fraser government. According to Prime Minister, Mr Malcolm Fraser, the new centre should replace the Royal Military College at Duntroon, Canberra, the RAAF academy at Point Cook, near Melbourne, and the naval college at Jervis Bay near Sydney.

Mr Fraser has told Parliament the concept of a joint military academy has been supported by chiefs of staff for 14 years. The intention was to centralize, improve and expand officer education.

Until recently the proposed institution was referred to as Casey University. University staff associations threatened to black it and now it is widely referred to as the Australian Defence Force Academy.

Mr Fraser first mooted the idea when he was Defence Minister in 1970. His commitment appears to have been unwavering—despite violent objections by university staff, strong reservations by vice-chancellors and the recommendation against its construction by the Public Works Committee.

Objectors appear to fall into three groups—those who argue the proposal is a relic of the "single defence force" concept of the 1960s, since discredited, they say, by overseas experience, those concerned by the cost which was estimated at A$49m three years ago and is now unofficially estimated to be between A$60m and A$75m, and those opposing the project on declining grounds.

The basic educational argument is that it would be impossible, within the structure of the university as outlined in the draft legislation, for traditional principles of academic freedom to be upheld. The opposition spokesman on education, Senator John Button, has described as bizarre the fact that the academy would have both a military commandant and a vice-chancellor in charge.

According to the Federation of Australian University Staff Associations, the academy will be far smaller than Australia's smallest university, yet it is intended to provide undergraduate and postgraduate training in arts, science and engineering.

"It is difficult to see how these roles could be fulfilled adequately", the federation's president, Dr Peter Darvall said.

Possibly what worries the federation most about the new academy is the capital cost, which could rise to A$150m but is often quoted as A$40,000 per student enrolled, compared to about A$9,000 for a student at any other university.

Under the present arrangements, officer cadets of the Royal Australian Navy taking a university degree spend a year at the naval college at Jervis Bay and do the remainder of their university course at the University of New South Wales.

Air Force cadets can complete a science degree, majoring in physics, by an arrangement with Melbourne University at the RAAF Academy.

The Army is the only one of the three services with a proper defence academy.

Australian soldiers in training at Duntroon

Research chief is named

from Robin McKie, Science Correspondent

GENEVA

The new director-general of CERN—the European organization for nuclear research—was last week officially named as Professor Herwig Schopper, the present director of the particle physics laboratory, known as DESY, near Hamburg in Germany.

The unanimous choice of Schopper by the council of CERN was made after an earlier dispute by the Italian delegation who wanted one of their own countrymen to be given the post.

Diplomatic manoeuvres have since smoothed out the problem and the new director-general will take up his post in January, 1981. Schopper will be the first CERN director-general for many years to have full powers, for previously the post has been split between a research chief and an executive leader.

Schopper's principal task will be to ensure a speedy decision on LEP—the large electron-positron collider which CERN is keen to build at its site near Geneva.

The project is keenly supported by physicists throughout Europe although there are several problems associated with its construction. A principal difficulty is the cost of the 10 kilometre diameter machine which would be partly constructed under the nearby Jura mountains.

The present price of the machine is given as 1,064 million Swiss francs (about £280m) although CERN intends to provide the entire costs through its annual international subscription of about 600 million Swiss francs, of which Britain pays about 16 per cent.

To do this could require an alteration in the convention of CERN, a problem which international lawyers are now investigating. If this was deemed unavoidable, then several years could be spent getting the convention changed to be ratified by the governments of the member countries.

Such a delay would cause a serious escalation in prices.

Senior academics face cuts in salary

Some of Australia's most senior academics face salary reductions of thousands of dollars under legislation to be introduced by the federal government.

Tertiary institutions found paying their staff above levels recommended by the Academic Salaries Tribunal will have their federal grants cut back by an equivalent amount. This will probably mean that academics paid above the recommendations of the salaries tribunal will have their salaries pruned to the recommended limits.

According to the federal education ministry, many academics are being paid well in excess of tribunal limits. A spokesman for the ministry said the higher payments were not widespread but were not uncommon.

Although Australian universities and colleges of advanced education will not admit how many academics are paid above the limits, nor how much money is involved, university and college sources say the government amendments could seriously affect salary levels of many senior academics, including vice-chancellors.

Little is known about how much Australian vice-chancellors are paid, or receive indirectly in the form of allowances, housing and transport. But informed observers claim that vice-chancellors at the larger universities such as Melbourne and Sydney may receive close to A$60,000—almost double that of a professor.

The legislative amendments will apply from next January and are to last one year but will probably be extended. The Minister for Education will have discretionary power to make final decisions on whether grants and salaries would be cut in particular cases.

Budget threatens university power

from Annelise Hopson

COPENHAGEN

The 1981 budget is giving cause for concern at the University of Copenhagen. Denmark's Directorate for Higher Education will have 53m kroner (£4m) less to spend during 1981. The cut of 1.4 per cent, which has hit all institutions within the state is due to a general reduction of the influence which wage and price developments has on the state's budgets.

The total grant to the University of Copenhagen for 1981 is 776m kroner (£59m) which is about 3 per cent less than that for 1980.

The university has until now received an annual grant which could be distributed to the five faculties and the administrative sector. The distribution was decided by the budget and executive committee of the governing body of the university.

From 1981, however, the Ministry of Education is going to stipulate the grants given and last February the university was informed about what sort of grants it could expect for 1981.

The rector of the University of Copenhagen, Mr Erik Skinhoej, says: "The cuts in the budget will hit all parts of the university, but the lamentable thing is that together with the economic cuts the Ministry is intervening in the autonomy of the university".

The rules have been that a teacher used his time 50 per cent for education, 40 per cent for research and 10 per cent on administrative matters. The new rules say that a teacher should be employed in either teaching or in research.

Mr Skinhoej said: "This is in my view a stagnation which a university cannot tolerate. Apart from a stagnation it is a direct decline particularly within research as we will not have any possibility to follow developments in concerning either research or education.

"It might be the beginning of the end and we must try to defend the barricades."

Copenhagen has at present 27,000 students and the model which the Ministry of Education is working to will bring the number down to some 20,000 by 1987.

Mr Skinhoej said: "The official motive for the division of research and teaching is to secure research. Because when the number of students is cut the educational sector has to be reduced too. This is why the Ministry wants to separate the two lines.

"To separate education and research is to break one of the fundamental principles of the university which has been working throughout its 500 years history."

Conflict worsens as sport minister refuses to intervene

by Guy Neave

NICE

Unrest is moving throughout the French education system. A strike followed by nationwide demonstrations brought all sectors of the education world to a halt for two days.

For the first time in ten years the *Fédération de l'Education Nationale*—France's equivalent in education to the TUC—called upon all its 45 affiliated associations to back the stoppage, which is a measure of the seriousness of the situation.

In schools and higher education unrest has been building up for a year. The end of the honeymoon period which greeted the appointment of M Christian Beullac as Minister of Education has come to an end. The uproar is comparable only to the scenes that took place in 1967 when only the universities were affected. At the universities of Grenoble and Nice the decision has been taken to extend the strikes which are now in their sixth week.

At Nice, following the government's decision to close the department of physical education, a tense atmosphere has prompted students to turn this local engagement into a national battle. Despite urgent representations by staff and students to the Minister of Youth Leisure and Sport, M Jena Soisson, no action has been taken. The Minister's reluctance to intervene has fanned the flames.

At Grenoble continuing conflict between students and authorities over the admission of foreigners to the university has made the situation deteriorate further. The police have twice been called to eject students from administration buildings in the past fortnight. Despite considerable support from arts and languages students for the strike the authorities are now taking a tough line. At a press conference the presidents of the three Grenoble universities stated that unless the strike was called off by next week the end of the examinations would be scratched.

In this atmosphere of tension proposals by the Minister of Higher Education, Mme Alice Saunier-Seité, to reform certain areas of postgraduate studies have provoked considerable unease. A fundamental reorientation of the *Diploma d'Etudes Approfondies*—roughly equivalent to the Masters Degree is envisaged. In future the *diploma* will not lead to research posts.

No less controversial is the increase in the number of hours students must study for the Diploma. At present students of economics and law follow 75 hours of courses in a year. This is to be increased to 300, 200 of which are to be in seminars. For students in arts and social sciences the number of hours, at present 75 hours a year, is to be increased to 150.

Strenuous opposition to these proposals scheduled for introduction next year has come from both university teachers' associations and university presidents. Many feel the new norms will not be matched by an equivalent increase in budget.

A general feeling is that this measure will eventually give rise to a two-tier structure in French higher education. Some universities lacking either staff or financial resources to implement the new proposals will, it is thought, be squeezed out of the area of postdoctoral study and become a moral extended version of the liberal arts college.

Degree 'still the best start for a career'

from James Hutchinson

BONN

Three out of four West Germans who have had a university education believe that their jobs could be done by nongraduates. Nonetheless, according to a recent survey, a university degree still provided the best start for a career in industry or the public services.

Top jobs in industry and in the civil service are held mainly by graduates, and people have a better chance of reaching the higher rungs of the ladder in industry if they have a degree in either law or economics.

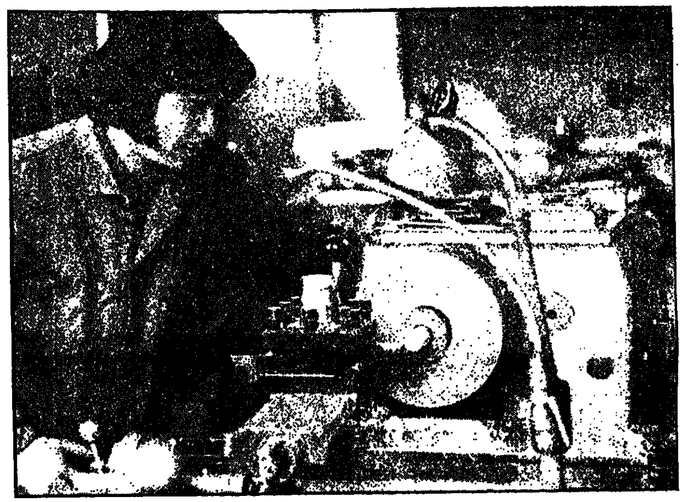
Graduates can expect much better pay too. The average monthly pay of the two million West Germans who have university degrees of DM4,900 (approx £1,200), compared with £440 for the rest of the working population. Some 42 per cent of graduates are salaried employees, 9 per cent are self-employed and only 12 per cent (this is a continuously decreasing proportion) are self-employed.

According to Professor Eberhard Witte, of Munich University, industry had engaged a vast number of graduates between 1950 and 1970, but since then recruitment has slowed down. This had been made good, however, by an increased number of openings for graduates in the public services, the political parties, trade unions and other public bodies.

Even so, the number of unemployed graduates has risen considerably in the past five years to a current figure of around 20,000. Forecasts of future requirements are widely held to be unreliable. In recent years universities had often cautioned people not to read law because career prospects for lawyers were bad, now there were not enough lawyers to go round.

Many educationists feel that fears of a glut of unemployed graduates are exaggerated. They think politicians are overdoing appeals to young people not to study, but rather to concentrate on vocational training. Professor Rudolf Mosbacher, the physicist, said recently that the best career prospects would continue to be open to graduates. There was a constant demand for more highly specialized knowledge of the kind that only the universities could provide.

The survey also looked at the politics of graduates, and concluded they were much more interested in political theories, programmes and developments than the rest of the population.



University that holds the key to scientific rebirth

Peter Scott reports on Chengdu, a candidate to become one of China's leading institutions

Chengdu University of Science and Technology in the capital of Sichuan, China's most populous province, is one of the universities that must succeed of the "four modernisations" proclaimed by the present leadership are to succeed.

The university has a lot going for it—designation two years ago as one of China's 89 "key" universities, a budget that has in effect doubled since 1978, a strategic position as candidate to become the leading higher education institution in the south west, and a valued link with the Royal Society in Britain.

But it has to start from a low base. Although the former institutions and department that were merged to form the university had reasonably good academic reputations, its designation as a "key" university owed more to geography than academic merit. It has hardly any postgraduates. Its library is small by the standard of Peking or Qinghua and is encumbered with rapidly dating Russian scientific books of the 1950s and early 1960s. Brand new equipment from Japan, like a 110,000 yuan—infra red spectrometer, is housed in dingy laboratories with damp walls and flaking paint.

Added to this must be the damage caused to Chengdu, and all Chinese higher education by the Cultural Revolution and radical policies pursued in the years up to the death of Mao Tse-tung. The university was closed between 1966 and 1972. Of the 140 new teachers recruited during the years of lower standards, all had to be sent on short refresher courses. Although 89 passed successfully, more than 30 had to be downgraded to laboratory and library technicians and seven even had to be assigned to work outside higher education entirely.

Chengdu is really just at the start of a crash programme to turn itself from being a reasonable provincial university into a first-rate national university in as few years as possible. Today the evidence of provincialism is still strong. More than half the students come from Sichuan (admittedly a province with more than 90 million inhabitants). The ratio of applications to places is low at two to one. The performance in the national university entrance examination required to enter Chengdu is much lower than that required by the more sophisticated universities of China's eastern seaboard.

Yet the evidence of a firm belief in Chengdu's future is equally strong. It is one of only four universities directly run by the National Academy of Sciences.

A radical reorganization of its academic structure has been undertaken since 1978. In the forthcoming national plan for higher education it is expected to be given the leading role in scientific and technological higher education in south-west China.

Mr Zhang Pei Jian, Chengdu's Chancellor, explained that the university's budget had more than doubled since it was taken under the wing of the National Academy of Sciences as a "key" university. In 1977 its total budget was just over 5m yuan. Last year it was more than 8m, or, if scientific equipment given in kind is included, 11.9m yuan. 4.5m of this total is for new equipment and books—both of which admittedly are badly needed.

The academic reorganization at Chengdu has been far-reaching. The structure inherited from the Polytechnological Institute of Chengdu, which was its name from 1952 to 1978 and had been formed from parts of Sichuan University and Sichuan Engineering College, was scrapped. Departments were upgraded, from machines and electricity to mechanical engineering and electrical engineering, and new academic departments in chemistry, physics and mathematics formed.

Although Chengdu is a technological university, a very high priority has been placed on giving students a better theoretical foundation in science.

This is why so much importance is attached to the link with the Royal Society. Mr Yim Bung Yian, the vice-chancellor, explained that the link had grown out of exchanges between the Chinese National Academy of Sciences and the Royal Society. So far a British Embassy official had visited the university twice just year to discuss what help Britain could give.

Mr Han said that whatever the British felt about academic standards at Chengdu the university needed help urgently as it was at a crucial stage in its development British help was needed to devise and start new courses, to help build up Chengdu's research, and to help with teaching postgraduates. Chengdu also wanted to send teachers to British universities to improve their academic standards, and urgently needed up-to-date equipment and books.

There is clearly some importance at Chengdu, which once had a considerable Russian academic presence, that it is taking so long to get the British link established. The university has already started intensive English courses for its staff and employed an American expert.

One way to describe Chengdu's present state is to compare it to a developing country at the point of economic "take-off". At present it has 3,340 students. Last year it enrolled 400: this year it expects to enrol 750. There are only 28 postgraduates, although 80 teachers from other higher education institutions are being given in-service training courses.

By 1985 the university expects to have 6,000 students—an increase of 90 per cent—and 1,200 postgraduates—a more than forty-fold increase. The total staff is now 1,220, although only just over 600 are teachers. So there is considerable scope for expansion within the existing resources of staff even by China's apparently generous standards.

Like many Chinese universities, considerable emphasis at Chengdu is placed on the integration of work and study. All students spend eight to 14 weeks working in one of the university's 10 workshops, which manufacture goods as complicated as power lathes and even fork-lift trucks.

However, perhaps even greater emphasis is now being placed on the need to achieve excellence in research.

The university has 78 laboratories, ranging from modern if Spartan to Dickensian. But it is difficult to judge its academic standing with any accuracy. Chengdu won 13 prizes for items of research at national competitions last year, and a further 38 in Sichuan competitions. It has reasonably well founded research laboratories for polymer materials and hydraulic engineering.

However, Chinese science received a great setback from the philistinism of the Cultural Revolution from which it is only just beginning to recover.

The progress of Chengdu in just two years has been considerable. Its academic organization has been recast to fit the university for its future role as an institution of academic quality. A start has been made in providing the resources to give substance to this role. Better students have been attracted. Less capable staff weeded out. The first step, and the most difficult, may have been taken. But the next few steps are perhaps easier to take than the ones that follow. A crucial question is how much more money the Government and the National Academy of Sciences is prepared to invest in Chengdu's success. Resources rather than academic expertise (although an effective Royal Society link would clearly help) are likely to be the main stumbling block.

Yet the experiment at Chengdu remains most interesting in the light of the present configuration of higher education policy in China. The designation of "key" universities is partly a restorative policy, to repair the damage done by the Cultural Revolution to the quality of China's existing elite universities. But it is also a dynamic policy, to create new centres of excellence in science and technology, as part of the "four modernizations". Chengdu's future progress is perhaps as good a test as any of the effectiveness of this second element.

The secret of learning to study despite being a student

Five years ago, says Alex Main, if you had asked anyone about learning, they would have started spouting about what psychology had proved with rats in labs.

"It's exciting that now people are really beginning to talk about students learning in a real situation what they're studying, how they're studying" he says.

Mr Main is adviser in educational methods at Strathclyde University's Centre for Educational Practices. Itself a breakthrough in learning. So far only 10 English universities and Aberdeen have someone concerned with staff training and development. Strathclyde is unique with its centre, established in 1976.

It is both a service unit to the university and an academic unit, offering an undergraduate class in communication. It has audio-visual equipment and as well as dealing with staff training and development, advises on curriculum development, and provides student counselling.

As adviser, Mr Main is responsible for a general study guidance service for all Strathclyde's students. There are talks and workshops on general study methods for new students, and individual consultations for anyone. The service also distributes information on study support to academic staff, and produces material for use in the centre and academic departments.

As a result of his work, Mr Main has just published a book, *Encouraging Effective Learning* (Scottish Academic Press, £3.25).

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However, says Mr Main, there is a completely unwarranted assumption in universities that students come in with higher skills, such as critical reading—reading for stimulus and challenge, and to assess values and ideas. He can help students distinguish between the five levels of reading skills varying from critical reading to light reading. This is the root of many students' concentration problems, as they have not been reading in the way best suited to their purpose.

He remembers one student saying to him: "Being a student just isn't conducive to being organized at all. You've got to study despite being a student." The second most common complaint is ineffective organisation of the content of learning. Students may report difficulty in taking notes or writing essays.

Mr Main has standardized procedures for dealing with these problems, which he has outlined in his book.

"But people are unique. These are simply the best ways of getting students to make their own decisions about work. The way you use your time is so closely connected with your whole life style. There's a vast difference between the 18-year-old away from home for the first time, and a 40-year-old married student with a family and commitments in society."

But all of these are simply pointing out to the students options they might never otherwise have considered: they do not impose a standard study pattern on them.

Individuality plays no part in the popular view of the successful student who has a regular schedule of study, works at the same time each day and mostly in the same study place, reviews notes soon after a lecture and does not get easily distracted.

Mr Main has found that, on the contrary, successful students are more likely to choose their personal and idiosyncratic methods of study than those based on textbooks, and their success is more likely to stem from their attitudes, motivation and personal attributes than "good" study methods.

Often students' problems stem from very passive approaches to learning, says Mr Main, and he maintains that for people going on to further and higher education there ought to be an increasing opportunity for independent learning, so that they are much more in control of what they are learning and how they are learning.

Students can be helped, he says, by anyone with a bit of effort and a bit of interest. For a mere £25, any institution could acquire around 10 invaluable books on study as the basis for a resource centre.

Although Strathclyde's service is anxious not to become a substitute or alternative for teaching, Mr Main often finds himself simply taking the place of a tutor who is not around or not very helpful.

The service often has to push students to ask for feedback from their tutors, as centre staff obviously cannot be experts in all subjects.

"It's the absence of feedback that actually slows down student learning", says Mr Main. "Even the best students will begin to doubt their own approach with no feedback, but they eventually cope anyway. The average student doesn't."

But Mr Main is not concerned to confine independent learning to further or higher education, or even vocational education, where he feels it should begin. "Our present educational system is based on the assumption that by 16 or 18 you should know what you want to do. But the world is changing very, very fast, and you meet new material at various stages in your life."

"The world's fate doesn't lie in material resources, but in human potential. And the only thing that will make people adaptable to change is getting them to learn how to learn."

Olga Wojtas
Scottish Correspondent

Patricia Santinelli looks at a new gimmick aimed at A level and first-year university students

A video star is born

A dapper A. J. P. Taylor regaled his audience, listening with baited breath, on how he had spent the weekend with friends only to discover that another guest was "that offensive fellow" no less than Maclean of Burgess and Philby fame. This, only a couple of days before the scandal became public.

Behind Professor Taylor could be seen his video image comfortably seated in a leather armchair expounding his latest ideas—on a less contentious topic—on the relations between Great Britain and Germany during 1933-39 and the origins of the war.

The former fellow of Magdalen College Oxford was attending the launch of a new history series on video cassettes in which he plays a star role.

The series aimed at A level and first year university students was released last month by Sussex Video. Another cassette shown on the same day shows Mr John Grigg discussing Lloyd George as a politician or social reformer with the premier's daughter Lady Olwen Carey Evans at the family home in Criccieth.

In the pipeline of this series edited by Dr Kathleen Burk of St Hugh's College, Oxford, are Mr Christopher Hill visiting the Cromwell Museum in Huntingdon to consider the protector's role as a revolutionary, and Dr Conor Cruise O'Brien talking about Irish home rule from the Dublin settings where the early dramas arose.

Mr Taylor's video lecture does undoubtedly, as most of the material he has ever produced, bring new insight to this fraught period of the 1930s on which much of the debate on British foreign policy has focused more on the question of individual guilt for appeasement or on the failure of appeasement.

This is supported by an excellent and concise booklet giving teachers and students alike information on preparatory work, a summary of the contents and a bibliography.

Certainly no criticisms of the video programme can be aimed at Mr Taylor himself. They must be directed squarely at the producers who chose to let Mr Taylor give a lecture unillustrated except for a couple of maps.

It is hard to feel convinced that students who after all can read Mr Taylor's books will have added to the sum total of their knowledge by watching him on video for two unbroken periods of 15 minutes each with no visual material to bring the subject to life.

Indeed this was confirmed by Ms Elizabeth Oliver, director of the British Universities Film Council which has extensive dealings in both film and video for the university and polytechnic sectors.

Her first reaction was that the programmes were competently made and might be of some use in schools but she hoped that the next productions would include more visual material of interest in higher education rather than just a "talking head".

"I do also think it is a bit much to ask anyone to pay nearly £40 to listen to Mr Taylor when you can actually buy his books for much less", she said.

In fairness to Sussex Video, which has earned a respectable reputation as producers of audio tapes for the educational market, it does say that the next programmes will contain more illustrative material—hopefully the Cromwell study will do just that!

What is much harder to assess is how justified Sussex Video is in believing that its approach/material is right for the educational market in Britain, which they confidently describe as a growing one with unlimited scope for expansion.

It argues that it tested the material by A. J. P. Taylor with students in America—it does admit to some worry about the "talking head" presentation—and found much to its relief that the audience was totally gripped.

However Sussex Video does not seem to be aware that the real competitors in this field it is so eager to exploit are the very universities to which it is trying to sell.

A. J. P. Taylor is one of a distinguished group of historians who have recorded video taped presentations for universities.

University audio-visual departments, television units all have the resources to produce their own. They do so and sell or hire them through the British Universities Film Council to other institutions, and the take up is apparently limited.

Moreover these departments have a fund of experience in the appropriate technologies but more importantly know the limitations imposed by the unwillingness of many teaching staff to accept video material. The heydays of the 1960s taught them that.

Dr Robin Moss, director of Leeds University Television Unit and a historian by background, says that higher education has in the past proved resistant to the video myth.

"I am slightly dubious on the likelihood of university departments of history flocking to purchase this kind of material, simply on previous experience of sale of films and videos, some of them not unlike the material described", he said.

Moreover many universities which have the capacity to make material in colour are eager to produce programmes for an external market and after all they do have the resources, and most likely at least one "big" name per institution. Another point is that illegal copying of audio-visual material hired from libraries is quite common in most institutions and much cheaper.

Very soon too the video disc will appear on the market. Philips plan to launch theirs this autumn at the same cost as an LP. This might not affect the educational market for some time but when it does much better research investment will be necessary for any company wishing to enter the video market.

Sussex Video's next venture is to be the production of programmes on Shakespeare, geography and architecture, all to be available in the same wide range of formats as the history series.

Status is the aim of the game

The Archbishop of Canterbury has corporate status. So do Shell, Unilever, British Rail, and the universities. Almost all polytechnic directors and governing councils are now in favour of gaining corporate status for their institutions. Indeed the five polytechnics controlled by the Inner London Education Authority (ILEA) already enjoy corporate status. But what exactly are the advantages and how can it be achieved?

Corporate status gives a body recognition in law. It creates a legal shell that exists irrespective of the individuals who comprise the institution.

The advantages depend on what powers are assigned to the "shell". Polytechnics want the right to hold property, to employ staff directly, to enjoy perpetual status and indulge in long-term planning, and, perhaps most important, the right to manage their funds once allocated.

Mr George Seabrook, director of Wolverhampton Polytechnic, says that it all depends on the terms of corporate status and that depends on how much financial control the local education authorities (leas) and the Department of Education and Science are willing to give up.

"The main worry that we have is over unwarranted interference from outside bodies. Once allocated we should be left to manage our own funds", he said.

Both the DES and the LEAs will need to be assured that the polytechnics will not use their new status to wind down their obligations to the local community. A subsidiary benefit for the polytechnics will come from being able to keep all their own income earned from short courses and consultancy work.

Staff costs account for about 70 per cent of most polytechnic budgets which are put in the form of an estimate to the LEA for approval. Many LEAs leave directors the freedom to make academic appointments once the budgets have been passed.

But others are described as "taking a stranglehold on affairs, checking every single detail". This happens notably in the appointment of non-academic staff.

Corporate status can be achieved in three ways. First through a memorandum of association which would turn the polytechnic into a company limited by guarantee and registered under the Company's Act.

Secondly, it can be achieved by an Act of Parliament, the same way the nationalised industries and the LEAs themselves were created. The powers of the institution would be prescribed by the Act.

The third way is by a Royal Charter. All the universities were established by charter which again lays down the powers and rights of the institution within the wording of the charter.

The CDP has shelved an initial campaign to win charter status for polytechnics mainly because the idea is associated in most people's minds with the "ivory towers" of the universities. The CDP said it was simply out to improve the running of the colleges and build up the flexibility to respond faster to specific local and national needs.

All five ILEA controlled polytechnics already enjoy corporate status. But in order they had to agree to abide strictly to all the financial rules of ILEA. "In fact the ILEA polytechnics are more oppressed by controls than the other 25 polytechnics. They undermined all they stood for gain by corporate status", Dr Rickett said. They would be keen for some changes.

The Polytechnic of Central London is exceptional in that it has corporate status, and that one of its constituent colleges, the Regent Street Polytechnic, was granted a charter in 1839, which Dr Adamson is now investigating.

A final point to note is put by Mr George Seabrook: "Corporate status has many advantages but it will clearly add responsibility. At the end of the day we will have to go to court and pick up the tab if necessary."

Paul Flather

Plenty of fountains but not enough to drink

Adults seeking to refresh their knowledge often feel unwanted. Ngaio Crequer reports the university view

Ask the universities about the role they have played in "continuing education" and they beam proudly at you. Ask those outside the universities and they shake sorry heads.

An exaggeration of course but there is a bleak desert of misunderstanding, lack of knowledge and differences of approach between people in the universities who feel they effectively respond to the needs of adults who wish to continue or refresh their education, and those outside who think they see only half-hearted effort or commitment.

Many of the universities can trace their origins back to the demands made by groups of local people who wanted some form of general education or training, or as communities expressed their desire for higher education in their area. Extension courses were the precursor of a large number of initiatives in continuing education.

Historically, therefore, the universities win the argument. Current day statistics are also impressive: the universities educate twice as many students in continuing education compared with their full-time numbers.

One of the problems is that the universities are poor publicists and the full extent of their commitment is not widely known. But they can be criticized for appearing to devalue extramural work by excessive compartmentalization. Some see too rigid and formal a line being drawn between continuing and conventional education which restricts their adaptability.

These are staff in extramural departments in the universities who would like to see the role of continuing education given more importance but they feel the opposition of traditionalists in the senate who see variation of the norm as a threat to standards.

The ambivalence of the universities' attitude was underlying education came across in a paper by Professor H. A. Jones, pro-vice-chancellor and Vaughan Professor of Education at the University of Leicester, at the conference, "The Universities and Continuing Education" this week.

As he put it, the universities have an honoured place in the history of adult and continuing education, but adult education had not had an equally honoured place in British universities. He also says that "... what the extra-mural record shows is that universities have adapted remarkably and quickly to the changing demands of society".

He listed examples, such as the training of professional people, the provision of courses for people at all levels in industry, the ability to offer updating and in-service education.

Professor Jones raised a question which must be answered if the universities are to press full speed ahead with meeting demand, and that is the cost.

The University Grants Committee makes no specific grant provision for part-time education. The Department of Education and Science pays for 75 per cent of the cost of approved extramural courses, and the rest is borne out of the recurrent grant. Post-experience short courses and professional in-service training courses are meant to be self-financing out of income.

In fact the system of financing is patch-patch. Fees vary considerably for similar courses at different universities and self-financing courses often rely on more UGC money than is credited, they are put at risk at times of local education authority cutbacks and they deter innovation.

Professor Jones said: "It will not do for the UGC to claim that a constant allowance in universities' grants for central services will suffice and the rest can be made up from course fees ... The principle of public support for people to complete their higher education must be accepted as applying to the part-time adult student just as much as to the 18-year-old school-leaver."

He suggested there is a need for a full-time equivalent formula for continuing education with UGC acceptance of the result as part of a university's student load in the same way as any other part. The position on tuition fees and the extent of student contribution would vary.

He listed a whole range of areas where demands will be made on the universities in the 1980s including post experience courses giving quick introductions to specialist fields of study and community development courses.

Professor Geoffrey Sims, vice-chancellor of Sheffield University, in a paper to the conference also pointed out the need for financial encouragement if the universities are to satisfy the needs of industry, commerce and the public sector. He said at Sheffield about 10 per cent of all teaching time was absorbed by the provision of short courses, and much of the time was given voluntarily.

He said in future the universities would need to be more professional in its organisation and also to play a more entrepreneurial role.

Perhaps Professor Jones makes the best summary. "If attention in the 1980s is concentrated on the proper development of continuing education, the universities and the Government can stop worrying about demographic trends and age participation rates, and about the low public esteem for higher education, and about the obsolescence of skills and knowledge in industry, commerce and community life ..."

Sartre's quest for the reign of the human

If the French writer and philosopher is to be taken at his word, it is only now, with his death, that we can attempt a coherent evaluation of his life's work. István Mészáros assesses his significance.

"Morality is . . . my dominant preoccupation; it always has been."
(Sartre in 1944)

In his last interview, a few days before suddenly being taken ill, Sartre expressed his hope to live for another 10 years "which may well turn out to be only five", so as to continue his work on a book "dedicated to the study of moral thought". Sadly, this was not to be: he died on April 15, hardly more than two months before his 75th birthday. "All my works", said Sartre in 1951, "are facets of a *whole* whose meaning one cannot appreciate until I'll have brought it all to an end." Today his work is complete in its incompleteness, and the many unanswered questions which he passionately raised and went on reiterating to the end provide our best keys to a better understanding of the meaning of his work. But more than that they also constitute an existential challenge to all those who are unwilling to pretend that he never asked them—so that he may be turned into an innocuous intellectual museum piece—or that asking them was a matter of no consequence.

Or, on the occasion of his 70th birthday, trying to stress the representative importance of Sartre's work, I compared him to Voltaire in order to put into relief that in recognizing the validity of a work, like Sartre's, as a critical mirror of the age, "we are captivated by the *process* . . . that produces the lifework and not necessarily by the particular *results*. Just how many of the individual works survive in the long run is quite irrelevant. What matters is the constitution of a *representative lifework*: a singular fusion of subjectivity and objectivity.

"If we want a parallel from the past—keeping in mind, of course, all the necessary differences and specificities—we may think of Voltaire, with his all-embracing and *overpowering* negativity. Situated at another juncture of great socio-historical transformation and tradition, Voltaire subjected the old order to the most devastating criticism and satire, quite unlike Rousseau, who complemented his radical negativity with anticipations of a new order to come. As we all know well, only a tiny fraction of Voltaire's immense lifework is read today. But if we try to imagine the eighteenth century without his contribution, we must immediately realize how much the poorer it would be for that."

Radical negation remained the hallmark of Sartre's work to the end, even when he was singing the praise of hope. His contemporary, Marcuse, who once sternly censured the negativity of *Being and Nothingness*, wrote in his last book with great resignation: "In reality evil triumphs; there are only islands of good to which one can escape for short periods of time." Yet he added that one ought to continue the "fight against the impossible", with an appeal to *hope in despair*. Sartre's last interview painted a no less desolate picture of the present: the triumph of right-wing ideas in the government circles of most countries; the revival of the cold war; the invasion of Afghanistan; the crying contrast between the poor of our planet who are dying of hunger and the rich, a small minority, who exploit them; the increasing danger of a third world war; success visible only in "little revolutions" and "little goals" while the great causes are "deared and disorder prevails; we live on a misserable planet" under the shadow of a nuclear devastation; our world is "ugly", "evil", indeed "horrible". Dr Rickett said. They would be keen for some changes.

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prevailing negativity was left to the years which he hoped for but were denied to him.

In truth, though, Sartre's inability to go beyond radical negations—in the form of "founding hope": of articulating his vision of "fraternity" in terms more concrete than yet another far-distant "ought"; of giving examples of that "radical conversion" which was merely postulated in *Being and Nothingness*, etc—was not a matter of lack of time. It was, rather, inherent in his relationship to the world, his attitudes and responses to it which deeply structured his work in all fields of his immensely varied literary activity, from novellas to film-scripts, from literary criticism to novels, from plays to biographies, and from massive philosophical syntheses to political pamphlets. He promised a "positive continuation" immediately after publishing *Nausea*, his first novel, way back in 1938, and a longing for positivity haunted his work ever after, without materializing in forms less problematical than varieties of "ought" and double negation.

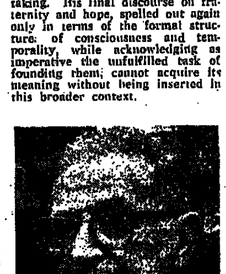
Undoubtedly, morality has been Sartre's dominant preoccupation throughout his life. The fact that he did not succeed in writing the repeatedly promised systematic work on morality should not deceive us in this respect. There is, of course, an inherently positive dimension of moral thought—the theory of values as distinct from the doctrine of obligation—which had to remain elusive to Sartre. At the same time, a vast area of moral judgment can flourish on the soil of negation—the more radical the better—and needs no firmer foundation to sustain itself than "hope" or the postulate of "fraternity", as they appear on the far-distant horizon. In this sense, Sartre was constantly engaged with the issues of morality: indeed, he was the greatest moralist of our century. If the world of today was as desolate and "horrible" as Sartre described it, the only vantage point from which he could appeal to its transcendence had to be the imperative of transcendence itself: the radical negativity of a moral intransigence that categorically refused to compromise its vision of a socialist humanity living in true fraternity, even if he had to assign the realization of such vision to an intangibly remote future.

To the objection that his notion of fraternity might be yet another utopia, he answered that it cannot be simply because myths belong to the *past* while fraternity is of the *future*. And he insisted that *morality*, through *obligation* as a dimension of consciousness, necessarily foreshadowed that future. Thus morality appeared as the counter-image of the present inherent in the structure of consciousness itself. Similarly, he asserted that *hope* itself is a formal structure of all goal-positing activity, and therefore as such it must be constantly in evidence no matter how hopeless the actual circumstances—just as he maintained in *Being and Nothingness* that "success is not important to freedom".

In order to prove that hope is an ineradicable and permanently vital structure of the pursuit of any goal, it would have been necessary to *found* hope so as to ultimately secure it against the suffocating impotence and pessimism bordering on cynicism which arise from constantly derailed, perverted and defeated goals. Likewise, to prove the reality of "fraternity", one would have needed a much more secure foundation than the definitional reference to an allegedly self-evident opposition in temporality between myth and fraternity. For even if such opposition holds, in principle "fraternity", too, may remain a permanently elusive goal, under the shadow of irremediably paralysed hope, nullifying the force of the appeal to the temporality of the future.

The task of founding hope and fraternity would have required on Sartre's part a radical transition from an ontology in which "success is not important to freedom" to one in which ultimately it could not be more important, and from a conception modelled on the formal structures of consciousness to a much less desolate vision of present-day social reality with all its manifold complex tendencies of development. Sartre, however, through all his changes remained within the orbit of the existential ontology, *of Being and Nothingness*, and at heart he could not reconcile himself to the idea of a less than categorical negation of contemporary reality.

This is why his great confrontation with the problems of history—in the *Critique of Dialectical Reason*—had to content itself with an analysis of "the *formal* structures of history", leaving the second volume on *actual history* almost completely unwritten, and painting the horizon of social development—as of the necessity inherent in the formal structures themselves—with the darkest colours of unavoidable failure, despite his own "longing for positivity" at the outset of this undertaking. His final discourse on fraternity and hope, spelled out again only in terms of the formal structure of consciousness and temporality, while acknowledging as imperative the unfulfilled task of founding them, cannot acquire its meaning without being inserted in this broader context.



Sartre: "Nobody could ignore him."

The day of his burial Sartre's coffin was followed from the hospital to the cemetery by a crowd never seen in France since Victor Hugo's funeral. Words of praise poured to France—for "Sartre is, too, France" as De Gaulle once said—from all over the world, and he was commemorated on radio and television as well as on the front pages of newspapers in every country: even in Vietnam with which he quarrelled recently over the boat people and over Kampuchea in the sharpest possible terms, after sustaining its struggle a few years back with the totality of his being.

A treatment very different from that usually given to intellectuals. But, then, Sartre was a very special intellectual even among the great: etc. What was in evidence not only in France but all over the world on the occasion of his death was the intensity of the response. Many people, from Latin America to various parts of Europe and from Africa to Asia, expressed deep sorrow and spoke of a direct personal loss. Some myopic little men, at both extremes of the political spectrum, indulged themselves in the futility of trying to denigrate him. But nobody could ignore him.

Andreas Papandreou summed up in a line what millions must have felt: "Our debt towards Sartre is incommensurable"; and Alain Geismar spoke of Sartre's "extraordinary *disponibilité* even for little causes". What was truly extraordinary was that so many people should feel so deeply indebted to a solitary intellectual.

Sartre never hesitated to take up even the greatest challenge, no matter how harsh were the odds against him, relying as his sole weapon on the power of words animated by the highest intensity of a moral passion. More than any other intellectual in our century, he continued to wage war on behalf of the oppressed throughout his life: even to list the causes he fought for, from the time of the Resistance to the tragedy of Kampuchea—through plays or pamphlets, films or demonstrations, tribunals or novels, public appeals or politico-philosophical treatises—would fill literally columns of this journal.

Characteristically, among his last published thoughts an intense concern for the "poor who are dying of hunger" figured prominently. In an age ruled by the false virtue of numbing compromises he never consented to the complicity of silence and accommodation, putting everything at stake on so many occasions. This is why millions of people are in his debt and mostly to the grief of a deep personal loss from all over the world.

We would never guess that this was the man whom Mauriac tried to describe 21 years after failing to persuade Sartre to join him and the other "immortals" of the French Academy—as "an incurably innocuous character, with a thirst for martyrdom". With very different intentions, President Giscard d'Estaing summed up his own thoughts on Sartre's death like this: "I feel the disappearance of Jean-Paul Sartre like that of one of the great shining lights of intelligence of our time." And yet, both utterances display the uncanny ability of the powerful and their anxious followers to miss the point by miles: to aim at the bull's head and to hit the cow's udder. Incurably inoxious character? A man who could open any doors which an army full of politicians protected by whole armies tried to keep barred? Mauriac's memory will never get over the absurdity of this judgment. As to the characterization of Sartre as one of the "shining lights of intelligence", such a disembodied intelligence is impossible to have in any intellectual, let alone in one like Sartre who so obviously and inseparably had to be confined within "the formal structures" which could be constructed without those mediations. This is why his *Critique of Dialectical Reason*, originally envisaged as a continuation of Marx's project turned out to be the greatest Kantian work of the century.

He declared that economics was "*not essential*", thus opposing not so much Marx as the "ugly and evil reality" of the world of capital in which it happens to be so deadeningly all-essential. Not concerned with actual mediations, he never undertook a serious study of economics—in sharp contrast to Hegel who could not have formulated his conception of history without the encyclopaedic knowledge which he possessed of the subject. The liberties which Sartre had constantly taken in his reconstructions of history were possible only in a world in which economics was not essential; and he defined economics as "not essential" because he had to take those liberties. Thus, clearly, things add up again to a coherent whole in Sartre's radical moral discourse, however problematical his assertion if taken in isolation. For he was concerned with the *moral outrage* that economics should usurp the place of the human, asserting his passionate conviction that it *ought not to be essential* because its rule keeps man imprisoned in his condition as "auto-mate" (*Sous-homme*) and constitutes a principal cause of preventing his self-realization as full man.

Sartre made an immense contribution to bringing nearer the "reign of the human" he hoped for, in which economics cannot be essential. Hence the lasting significance of his representative lifework.

The author is professor of philosophy at Sussex University.

Why the vital resource is resourcefulness

In the second article in our series based on the special lectures in honour of the Royal Geographical Society's 150th anniversary this year, Gerald Manners explains why the countries of Western Europe have an increasing role to play in the field of energy

Since 1945, and more particularly since the middle 1960s, questions about the future supply and potential scarcities of energy and mineral resources for the industrialized economies of the world have moved towards the centre-stage of public interest and debate. They first appeared as an essentially academic prologue. With the commodities boom and the establishment of the OPEC cartel in the early 1970s, they then became a matter of urgent economic and political concern. Today, as the world economy hesitates in the uncertain entr'acte of another recession, resource issues (with the exception of oil supplies) are standing mute in the wings once again. But the next acts in the theatre of energy and mineral supply could well be dramatic indeed.

The recent revival of concern about the long-term availability of natural resources stems substantially from the extraordinary pace at which the world economy grew in the 1950s and 1960s, and the ever-increasing demands that the industrial nations have made upon our planet's resources.

It is not surprising, therefore, that the most persistent and articulate discussion about resource futures and possible scarcities has occurred in the United States, a country which has acquired the most ravenous appetite for more and yet more energy and mineral raw materials. Moreover, that country's own natural resource endowment, the abundance of which had for so many generations appeared to be virtually limitless, has increasingly exhibited signs of inadequacy, to the extent that (at present prices and with present technology) it can only satisfy a declining share of the country's resource demands. Indeed, during the past 30 years the United States has turned hesitatingly but increasingly overseas for supplementary supplies. And as the image of the cornucopia has faded, so the import bill has mounted.

By the late 1960s, however, worries about the longer term supply of resources were becoming more universal—at least in the non-communist world. In Western Europe especially, sustained industrial development, plus a very substantial and increasing dependence upon overseas materials, prompted more frequent expressions of disquiet — about economic growth in general, and the adequacy of its raw material base in particular.

An increase in resource questioning was further encouraged by the realization that a significant shift was occurring in global geopolitics, as economic and political attitudes towards the ownership and exploitation of natural resources altered in the post-colonial world. Host governments have asserted their national interests; and in some respects a New International Economic Order has already evolved. The major industrial nations outside the Soviet Union, and especially the countries of the EEC and Japan, therefore, have been left not only heavily dependent upon imported supplies of energy and minerals, but also facing a set of circumstances in which interventions governing the development and exploitation of non-renewable resources in other parts of the world.

The outcome of academic questioning at the most generalized levels of theory has been disappointingly inconclusive. There is still no clear and robust answer to the questions: how adequate are the world's non-renewable resources in the longer term?

Neoclassical theories of resource adequacy have been based upon the notion that national concerns about physical scarcities of non-renewable resources. The first, and more pessimistic, assumes that there is a fixed stock of each particular resource. And it postulates an increasing scarcity and rising real cost of exploitation through time. The second, and much more optimistic theory, on the other hand, asserts that the unit costs and relative prices of mineral materials tend to fall through time as increasing supplies of lower grade materials become available through technological advance and improved industrial organization. This view demands considerable qualification in the light of serious technological uncertainties, rising real energy prices and new ecological evidence on the distribution of scarce minerals. It is, nevertheless, towards a school of "qualified optimism" that the generality of academic opinion has been tending to move in recent years.

A minority of observers, have, however, come to question the central role accorded to the market in neoclassical theory, and in particular the legitimacy of allowing scarce and finite resources to be allocated between different generations of consumers solely through the interaction of contemporary forces of supply and demand.

The intergenerational equity school, therefore, argues that alternative and better means of resource allocation through time should be sought—bearing in mind of course, the fact that the present generation does not appear to have been significantly deprived of any crucial raw materials as a result of the workings of the market in the past, and the fact that the exploitation of some finite resources today could well yield subsequent generations equal or even more valuable assets in the form of technology and/or capital stock that would not otherwise be available to them. Ultimately, of course, they have raised a question of ethics. The moral imperative not to waste finite natural resources has been reaffirmed. But beyond that simple touchstone, which has always underlain the attitudes of the conservation movement, the intergenerational equity school has offered no obvious guidelines for private or collective action.

While the several theories of resource adequacy remain inconclusive, the qualified optimism of one neoclassical tradition nevertheless appears to offer the best initial, tentative framework within which to interpret the future. Particularly is this the case when the unconstrained time dimension of theory is replaced by a search for an understanding of resource prospects over the next, say, 50 years.

A declared time scale has the advantage not only of permitting the tentative measurement of alternative futures, with an open declaration of the assumptions upon which they are based, but also the opportunity to set alongside each other estimates of the future levels of energy and mineral demand and the known reserves of those non-renewable resources. It is reassuring to note that, when those recent compilations of available data and forecasts on those matters, the OECD Interfutures project, concludes very positively that resource concerns defined in the narrow sense of physical adequacy are ill-founded. The Interfutures team concluded that known energy resources "should be sufficient to meet in the long term and on a regular basis world consumption: levels which will be 10 to 15 times higher than that of 1975, at costs which over the period are not more than twice or three times as high as production costs in 1974"; and that in the matter of minerals supplies an "overall physical scarcity of industrial raw materials through the natural depletion of resources and reserves is not a likely eventuality". Behind these assurances, however, lie a number of critical assumptions and qualifications.

On the demand side of the question it must be noted that quite fundamental differences now exist in general expectations about world economic growth, and about the relationship between growth and future resource demands, as compared with only a few years ago. Growth rates have fallen; and resource coefficients have been lowered. While the future magnitudes of these measures are uncertain and the subject of legitimate disagreement, there can be little doubt that the cumulative quantities of non-renewable resources that will be required over the next half-century are now seen to be substantially lower than were thought likely to be required by the commentators of the early 1970s. However, the general proposition of adequacy does not mean that there will not be major changes in the patterns of demand for particular sources of energy and particular minerals. The next 50 years in fact is likely to see a substantial transition, as oil and gas supplies become relatively scarcer, and as higher cost materials are substituted in the market by more abundant and lower cost alternatives.

Turning to the supply side, it should be recalled that in attempting to quantify the future availability of energy and mineral raw materials, the evidence that has to be employed is substantially (if not totally) a projection of the working inventories of the resource industries. It is also noteworthy that the estimated size of the world's non-renewable resources has been regularly revised upwards over the last few decades—hence the way in which periodic supply concerns never seem to be followed by enduring resource scarcity. In 1942 the ultimately recoverable crude oil reserves were estimated to be 600 thousand billion barrels; yet by 1971 the figure has been revised upwards to 2,290 thousand billion barrels—a 31-fold increase. And the same story can be told for most minerals.

Given the recent propensity to revise future expectations of resource demands downwards, plus the historical tendency to adjust estimates of future resource supplies upwards, the conclusions of the *Interfutures* team are doubly reassuring. On the other hand, four matters on the supply side, do give cause for concern. The first is the geography of known energy and mineral reserves, which are highly localized in particular parts of the world.

The concentration of oil reserves in the Middle East, for example, are paralleled by a high proportion of the world's reserves of platinum, chromium, manganese and vanadium in South Africa and the USSR. This geography of supply is unlikely to be matched by the geography of demand. The evidence in consequence suggests that the question of access to raw materials could be of greater importance than overall physical adequacy; and within the economies of OECD, the problems of access are particularly acute for the countries of the EEC and for Japan. This is a matter which should powerfully inform their foreign policies.

A second area of concern follows from the growing impact of resource exploitation and processing upon the environment. With the greater use of low grade materials, enormous problems of waste disposal arise. Yet changing public standards with regard to pollution are requiring the resource production and processing industries increasingly to handle their wastes more sensitively. In North America especially, legislation and administrative decisions have begun seriously to constrain the behaviour and increase the costs of energy and mineral production. The rest of the world, too, is increasingly aware of the same conflict between economics and ecology, and it seems likely that many other countries in both the developed and developing world will adopt similar measures. The speed and the sensitivity of this governmental reaction to growing environmental concerns will undoubtedly have a considerable bearing upon the cost, the geography and the availability of energy and mineral supplies over the next half century.

Yet another question on the supply side concerns the availability of the increasingly large sums of capital that are today required for winning and processing raw materials. In recent years the mining industry in particular has drawn attention to the collapse of many traditional conventions with regard to the ownership and exploitation of minerals. It has also stressed the consequent crisis of confidence which exists in some quarters concerning the wisdom of investing large sums of money in projects with long lead times, when the normal commercial rewards have to be discounted by substantial political uncertainties. These uncertainties are at their greatest in the developing world.

Yet on any balanced reading of the future non-renewable resource situation, a substantial contribution will need to be made by the less developed countries to world energy and mineral supplies in the next 50 years. These countries will be unable to raise the necessary capital themselves. For supply adequacy to be assured, therefore, mechanisms will have to be developed to encourage with confidence the international transfers of large sums of capital for resource development, and it is not yet clear how this will be achieved. There is another role here for the governments of the major consuming countries.

A final qualification to the notion of resource adequacy concerns the supply and the costs of energy. The most impressive feature of evidence on resource supply at the moment is the relative scarcity (and the likelihood of rising real prices) of fossil fuels in general, led by oil in particular. The situation does not merit the exaggerated concerns that underlie many political and media commentaries. However, it can not be escaped that considerable obstacles exist to the substitution of alternative sources of energy for oil.

The transition to a revised world energy economy with less dependence upon oil is likely to be psychologically difficult, and in practice very slow with many adjustments involving very long lead times. In this area, there can be little doubt that the policies and the actions of governments will be highly influential in encouraging both the pace and the direction of change. All the matters of concern about resource adequacy over the next half century—access to supplies, environmental impact, capital transfers, and the energy transition—are not only capable of government influence, but positively require direct governmental attention. It is fair to argue that the degree to which these difficulties in the event are overcome will be a function of the relevance and sensitivity of public policies in many parts of the world.

It is also very clear that differences exist in the possible and likely prospects that lie before the major political groupings in the world. The situation in Western Europe is in many respects unique. As elsewhere, its resource requirements over the next 50 years will be a function of its rate of economic growth, and changes in the resource coefficients for energy and minerals.

They will also respond to the shifting geography of mineral processing. The success of Japan and Korea in developing their iron and steel industries, the major expansion of petrochemical capacity now under construction in the Middle East, and the recent shift of major aluminium investments to low cost energy sources in the developing world such as Algeria, Bahrain and Iran, amongst other signs, suggest that the growth of these activities in Western Europe is likely to be modest in future. This will have a consequential impact upon the rate of growth of resource demands there.

Nevertheless, attention needs to be given to the supply of materials for the regional economy. It is inevitable that some of the existing energy and mineral sources of Western Europe will be depleted over the next 50 years. The geological prospects of the region, on the other hand, preclude a massive expansion of energy production or of its mineral industry. There is however, some room for manoeuvre. In the realm of energy supplies, there is a major unresolved dilemma concerning the degree to which Western Europe should seek to support its deep-mined, relatively high cost, domestic coal industry in the face of competition from opencast, low cost, imported alternatives. The opportunity also exists for increasing the pace of development of the region's oil and gas supplies, if appropriate licensing, depletion, pricing and taxation policies are adopted by the governments principally concerned.

In the longer-term however the countries of Western Europe must accept a relatively meagre resource base in relation to their needs, and develop appropriate relationships with the rest of the world with this in mind. The central question facing the region with regard to future energy and mineral supplies concerns longer-term access to reserves in third countries—at places, times and prices that are attractive to the host governments and consuming interests alike. The predominant characteristic of Western European supply arrangements in the past has been the substantial reliance placed upon the market mechanism—most of all in Britain, but only to a slightly lesser degree in West Germany and France.

However, the balance of public and private roles in the supply of Western Europe's resources has begun to change. Governments everywhere are increasingly involved in managing their energy economies. The establishment of the OPEC cartel has created a much more central role for governments in the matter of oil procurement. And international bilateral agreements affecting mineral supplies are increasingly common.

The growing participation of governments in arrangements for the supply of both energy and minerals can not be escaped, although the degree and style of their roles clearly varies from country to country. Moreover at the supra-national level of the EEC, political concerns about resource supplies have become increasingly evident, even though attempts by the Commission in Brussels to forge common policies towards energy and minerals supply have so far been substantially abortive. The divergence of national experiences and interests at any one time are all too apparent. The common interest has too readily been overlooked.

Given Western Europe's heavy dependence upon resources and the uncertain geopolitics of the world in the next 50 years, at the very least there is a collective interest in minimizing the risks of interrupted access to particular resources through a deliberate diversification of the geography of resource imports. Where diversification is impossible for geological reasons, there is scope and value in creating stockpiles in the general Community interest. And, clearly, any stabilization of the conventions surrounding international investment in energy and mineral resources is more likely to follow from collective rather than national efforts.

It cannot be escaped, therefore, that governments individually and collectively in Western Europe have a major and increasing role to play in energy and resource matters. Given this proposition, it is reasonable to expect that the information upon which policies are formulated is accurate, that the tenets that inform the making of policy are acceptable, and that both are made freely available for public scrutiny. For this reason the studies, the "communications" and the publications of the EEC Commission are to be welcomed, whereas the silence, the lack of public discussion and the clear lack of Departmental responsibility for mineral supply matters in Whitehall is just cause for concern.

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Peter Toyne examines the problem of students who quit

Plugging the dropout brain drain

As the academic year proceeds, tutors, counsellors and administrators alike are reminded of the various difficulties and problems caused by the perennial "dropout" phenomenon—students who fail their examinations or decide for other reasons not to continue with their studies. Quite apart from the obvious problems and heartaches which this causes for the students concerned, the potential drain on scarce resources, educational capital and financial investment which this phenomenon involves cannot be inconsiderable. At a time when the sytem of higher education is being closely examined, the problem of these noncompletators is one which merits further attention.

Some insight into the reasons why students may not complete their courses is afforded by a small sample survey conducted as part of the Educational Credit Transfer Feasibility Study. Four universities (Aston, Exeter, Loughborough, Newcastle) and four polytechnics (Bristol, Liverpool, Newcastle, Sheffield) cooperated in this part of the study, and the 2,215 students who between September, 1977, and March, 1979, left their courses at those eight institutions without completing them were invited to complete a short questionnaire on the subject. In all, 1,037 usable replies (476 ex-university students; 561 ex-polytechnic students) were received, making a response rate of 47 per cent.

Of the students in this sample, 30 per cent left because they failed their examinations, but the overwhelming majority left for a variety of other reasons, the most frequent of which were essentially academic in nature (Table 1). Thus, 42 per cent of the 723 students who left without failing an examination claimed that their main reason for leaving was that the course on which they had embarked had not turned out to be as they had expected. In particular, the claims were that the emphasis of the course and the detailed syllabus had been very different from what they had thought it was going to be, and that as a result they had either simply lost interest or were doubtful as to whether they would be able to cope with the course.

The second most quoted reason (given by 16 per cent of the students) was that the university or polytechnic at which they had studied turned out to be generally less attractive than perhaps they had imagined it was going to be and they had consequently found it hard to settle down. A variety of factors were quoted as contributing to this, of which the most common related to the size of the institution, its perceived general ambience and social life, and the geographical area in which it was located.

As might be expected, this factor was more frequently quoted as a reason for leaving by those students for whom the institution was not their original first choice. Thus, it was given by 21 per cent of students for whom the institution was their second choice and by 28 per cent of those for whom it was their third choice. Interestingly enough, this reason for leaving was very much more commonly given by the second and third choice polytechnic students (32 per cent quoted it as the main reason) than it was by the second and third choice university students (24 per cent quoted it).

Illness was the third most frequently given reason for withdrawing from courses and the proportion of former students involved (15 per cent) was approximately the same in the universities as in the polytechnics.

Beyond these three major reasons for leaving there are some interesting differences between the university and polytechnic noncompleters. The next two alleged causes quoted by the former university students related, respectively, to boyfriend/girlfriend problems and finance. 11 per cent of them left because their boy or girl friend was somewhere else and they did not wish to remain separated from them, while nearly 10 per cent left for various financial reasons. In the case of former polytechnic students, however, the boyfriend/girlfriend reason appears to be far less important (only 5 per cent quoted it as reason) whereas financial difficulties (perhaps not unexpectedly?) are rather more significant and form the fourth most frequently quoted reason for not completing the course.

It is somewhat disturbing to see that among the various reasons given for leaving, those relating to the nature of courses and the institutions in which they were taken were so paramount. Is it the case, as this evidence implies, that prospective students are ill informed about what they are going to study and where? Is it that they find relevant and detailed information difficult to obtain or is it simply a case of their not taking the trouble to find out what they need to know about the course before starting on it? Whichever it is, there are some obvious implications both for those who advise potential students on their higher education choices and those who furnish information about the available courses. Are we making the right kind of information available and are we really encouraging potential students to do as much as they can to find out as much as possible about the courses and places of study which they select? The "alternative prospectus" might not be the ogre which some feel it to be if it could provide potential students with appropriately objective and detailed information. It might indirectly contribute to a reduction in the drop-out rate which, as this survey suggests, appears to relate as much (if not more) to information provision as to anything else.

However, before students do actually leave their courses prematurely there is always the possibility that they may consider transferring to another course or another institution or to another course in another institution. Half of the 1,037 former students in the present survey, for instance, did just that and actually considered the possibility of seeking a transfer (see Table 2). In turn, almost a half of those who considered the possibility went as far as making a formal application for a transfer, so that roughly a quarter (26 per cent) of the students who did not complete their original course sought a transfer. It is worth noting that 74 per cent of the university students and 68 per cent of the polytechnic students who did apply for a transfer in this way were successful. This means that 19 per cent of all the university students and 17 per cent of all the polytechnic students who failed to complete their original courses transferred to another course and/or another institution.

The important question this raises is whether this proportion could be increased, thereby leading to a reduction in the numbers of those who leave the system without completing successfully.

There are two groups of potential students to be considered: those who *never* considered transferring and those who considered it but did not finally go ahead and apply. The present survey shows that of those who never considered the possibility of a transfer, 60 per cent were simply not interested in it at all, 21 per cent did not realise that such a course of action might have been open to them and 19 per cent thought the obstacles to transfer would be too great (even though they knew that it might have been a possibility. Of those who *did* think about a transfer but did not finally apply for one, the majority (75 per cent) said that they thought the obstacles would be too great once they started the search, so they decided not to bother. Interestingly, this view was much more prevalent among the university students (82 per cent of whom perceived great difficulty ahead) than among the polytechnic students (69 per cent of whom considered the obstacles likely to be sizeable). The remaining 18 per cent of the university students and the remaining 31 per cent of the polytechnic students claimed that they had not finally proceeded because they had found it difficult to obtain suitable information on what the possibilities for transfer might be and on how to set about the task.

The evidence shows that three quarters of the noncompleting students did not apply for a transfer before leaving and that two-thirds of them did not do so either because they did not realize that such a course of action might be open to them or because they *thought* it would be difficult to arrange a transfer or because they found it difficult to get hold of appropriate information about it. The implication is again clear enough—better information and help needs to be made more readily available to potential noncompleters if more of them are to be encouraged to think of possible transfer within the system rather that to be allowed simply to leave the system altogether, with all that is incurred in terms of lost places and wasted educational potential. In turn this raises the centrally important question of the extent to which transfers of this kind *are* actually available, and perhaps even *ought* to be encouraged in order (hopefully) to keep able students within the system who might otherwise withdraw from it. The high success rate of those who did apply for a transfer suggests that at least the possibility exists and that opposition to it in practice may not be so great as many believe it to be.

Further research of a more comprehensive nature into this important problem is patently needed, but the results of this small sample survey certainly appear to highlight the central role which the provision of better information and advice relating to courses, institutions and transfer opportunities in higher education could play in reducing, both directly and indirectly, the scale of the noncompletion problem.

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TABLE I: Reasons students give for leaving (percentage of students who had not failed examinations).

	% of students stating reasons shown		
	UNIVERSITIES (100% =335)	POLY. TECHNICS (100% =338)	TOTAL (100% =723)
Course not as expected	40.7	43.3	42.0
Family ties	3.8	3.7	3.8
Financial problems	9.6	10.7	10.1
Boy/girlfriend problems	11.1	4.5	7.8
Illness	14.3	15.6	14.9
Institution difficulties	16.8	15.2	16.0
Other	3.7	7.0	5.4

TABLE II: Students who considered or applied for a transfer before leaving.

	% of students		
	UNIVERSITIES (100% =476)	POLY. TECHNICS (100% =561)	TOTAL (100% =1037)
Students who considered a transfer	53.8	47.1	50.1
Students who applied for transfer	26.2	25.9	26.0

English instructor with Cypriot student at the Higher Technical Institute established in 1968.

Cyprus: a university in place of strife

John Eggleston argues that a recent plan for tertiary education would help unite the divided Mediterranean isle

If there are to be any economic miracles in the 1980s then Cyprus is likely to be the place where one of them occurs. And if this happens, then the development of tertiary education is likely to play a central role. The contrast between Cyprus's recent past and likely future is dramatic. Despite years of strife before independence and partition shortly after it in which some of the most recognizically interesting areas of the island were lost and the capital Nicosia divided with its airport rendered unusable the economy shows every sign of booming. The tourist industry is burgeoning, new factories are being built everywhere and a large visible presence of most of the key international companies is unmistakable.

To accompany this economic growth there has already been a strong development of tertiary education. There are six institutions dominated by the Higher Technical Institute with some 500 students following a range of courses in mechanical, electrical, civil and engineering. In addition there are specialist institutions for teacher training (The Pedagogical Academy); The Forestry College; a school of nursing and a school of psychiatric nursing. The Cyprus Productivity Centre and a rapidly growing hotel and catering institute. Overall, these establishments contain approximately a thousand students, 5 per cent of them coming from abroad, predominantly from Libya and central African countries where there are close links.

Substantial development is taking place. The Hotel and Catering Institute established in 1969 is particularly well equipped with its own training hotel and restaurant and conference facilities of international standard. The Cyprus Productivity Centre is fast expanding into a centre for managerial training also attracting students from overseas. There is also a growing research presence in the Agricultural Research Institute and the Cyprus Research Institute which specialises in human sciences and Cypriot studies. Both of these institutions are supported jointly by governmental and international funds. Outside the state institutions there is a thriving private sector providing foreign language instruction and business administration.

But the major problem of Cypriot tertiary education lies beyond the capacity of these existing institutions. It is the deeply felt lack of a Cypriot university. Some 12,000 students seek tertiary education abroad, mostly in universities. It is a figure that far outnumbers the 950 Cypriot students who currently follow tertiary education on the island. In the world league table of the proportions of students attending tertiary education Cyprus ranks fourth, far ahead of most countries with well-developed university systems. The demand for university education is growing. Cyprus still has a good record of graduate employment which shows signs of continuing as economic development accelerates. Of the 12,000 students, 60 per cent study in Greece (the numbers are so great that Greece has now imposed a quota on Cypriot students). Approximately 20 per cent study in the United Kingdom and 7.5 per cent in the Eastern block countries. The cost is vast. In 1976-77 this amounted to 12 per cent of the country's gross national product (most of it contributed from private rather than state funds). As the cost of tertiary education rises sharply in Britain and other countries, the burden becomes increasingly prohibitive.

These economic difficulties constituted a major factor in the decision by the Council of Ministers in December, 1976, to establish a university in Cyprus—a decision following a feasibility study completed in 1977. The stated objectives of the proposed university make familiar reading; they include: "to provide Cyprus with a locus of academic life which would provide opportunities for challenging discussions on social, professional, cultural, scientific and other matters . . . and to provide the Cyprus society with the benefits that can be derived from the presence of a student body and the interaction they can have with the other groups on lifestyles, ideas and attitudes".

But perhaps the most important reasons are neither these nor even the economic issues, but flattered the political arguments. Cyprus is alone among Mediterranean countries in not having a university. Even in the Island of Crete the Greek government is now establishing a second university. The desire for political and cultural prestige makes a compelling case that is strengthened rather than diminished by the need to reaffirm a new national identity in the sector of the island that remains independent after partition. Not, surprisingly this is a fear resisted by the Turkish Cypriots, notwithstanding the Council of Ministers' assurance that "special arrangements would be made to satisfy the needs of the Turkish Cypriot students".

To realise these plans the Cyprus government will have to enlist massive international support as new universities become expensive in the 1980s. Currently a number of international organizations, notably UNESCO, are being consulted and much will clearly depend on their response, particularly in the political partition of the island.

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Patterns of change

Maurice Kogan and Tony Becher on how institutions adapt courses to conform with shifting values and modifications in the external environment

We shall review six different patterns of change affecting the basic unit without wanting to suggest that our catalogue is complete. They could be said, respectively, to exemplify changes in overall rationale; in curricular emphasis; in course structure; in disciplinary perspective; in teaching practice; and in assessment techniques. Each characteristically stems from *a somewhat different source* and reflects a different constellation of elements in the model.

The first type of change usually arises from a major shift in values in the external environment of higher education—a shift which may not only call into question the established assumptions which lie behind a given basic unit's work, *but also jeopardize its existence* by reducing its attractiveness to students. There can, for example, be no denying the steady modification in intellectual climate over the past century which has demoted divinity schools and departments of theology from a major to a marginal role in university affairs.

In consequence, many such units have chosen to reappraise their own internal norms, and to extend their function from the training of future members of the Anglican clergy to the provision of broadly-based comparative courses on world religions, with few if any vocational implications. This form of innovation is the more powerful for impinging simultaneously on the normative and the operational modes of the basic units affected by it; the more inexorable for giving rise not merely to changes in curricular provision but also to a search for a new ideology and raison d'être.

The second type of change, though less far-reaching, is occasioned in a similar way by modifications in the external environment. But in this case the new element lies in the social or professional expectations invested in graduates, rather than in a broader or more pervasive value shift. Such a change more commonly affects vocational than non-vocational degree programmes, and is sometimes strongly reinforced by the outside body responsible for maintaining professional standards.

A clear example is afforded by the inclusion in engineering curricula of a "social science" component meant to relate functional competence to an understanding of the social and economic context in which technological developments take place. The obligation to introduce "engineering in society" courses has been strongly pressed by the professional engineering institutions, but it reflects a wider demand on the part of employers that graduate engineers should have certain qualities beyond the narrowly vocational skills and a narrowly technocratic outlook.

The effect, in terms of our model, has been for a new element in the norms of the wider peer group to lead to a comparable reshaping of the norms of the basic unit, and thence, to shifts in curricular emphasis at the operational level.

Changes in course structure—our third category—can be brought about in a number of ways for a variety of reasons. The subset relevant to our present discussion is generated by market pressures on recruitment. They characteristically affect newly-established teaching programmes and also some courses in institutions which have relatively low status within the system.

The problem confronting the basic unit involved in such forms of provision is to compete effectively with rival offerings which are of long standing, or situated within prestigious institutions. The solution involves seeking some special means of attracting students, often by drastically reshaping the conventional degree programme.

Leaving aside examples of this strategy at the level of the institution as a whole (interdisciplinary courses in a number of the new colleges of higher education; modular degree programmes at many polytechnics, "sandwich" courses interweaving academic study with work experience at several technological universities), instances at the level of the basic unit would include language programmes which abandon classical literature for an emphasis on practical competence and an awareness of contemporary social and economic developments; the introduction of "degrees by independent study" in a handful of polytechnics and new universities, and the adaption of a "systematic" integrated approach to medical *training, alongside an early introduction* of clinical work, in some of the recently established medical schools.

The range of innovative enterprises of this kind at the basic unit level is constrained by institutional regulation as well as by the risk of disapproval by the wider peer group. Nevertheless, the need for *survival in a competitive market can* generate major innovations in the structure of the curriculum.

It may be useful to consider next a contrasting type of change which—though often no less far-reaching—is generated entirely within the academic world and seldom has any external causal link (though there may in some cases be important *indirect* connexions). What we have in view is not the straightforward accretion of new ideas and materials which constitutes the everyday task of research, technology and scholarship, and which duly finds its way into the currency of the undergraduate curriculum.

It is, rather, that more remarkable process referred to by T. S. Kuhn and his followers as a change of paradigm: a substitution, in our terms, of a substantially new element for a significant part of the existing norms of a whole academic peer group. Changes in this category are in fact closely comparable with the internally generated realignment, at the institutional level, of basic units such as biological sciences and computing.

Changes which involve the reappraisal of an academic subject area as a whole are rare: those involving a particular sub-speciality within a broad field are relatively more commonplace. One recent example of a major shift in paradigm, or set of disciplinary norms, can be found in geography, where the old territorial disposition of physical geography on the "one side" and human geography on the other has been largely superseded by the imperial claims of a new discipline based on quantitative techniques of spatial analysis.

Such changes might be claimed to constitute the essence of the academic enterprise, even though they involve a limited range of components of the system as a whole. The process characteristically starts in the operational mode with new patterns of research, whose findings in more "guru" effect peer group norms in the wider scholarly community.

This has given rise to significant changes in the nature and content of courses—changes reminiscent of earlier, though more limited, influences on mathematical teaching from the development of set theory or physics from the establishment of relativity theory and the uncertainty principle; and on social history from the importation of the techniques of demographic analysis.

Once the new norms are sufficiently established at the level of the basic unit, the impetus to be translated back into the operational mode in terms of changes in the nature and content of courses.

The last two sets of changes we shall consider at the level of the basic unit are also predominantly internal, though less far-reaching *in their impact on the curriculum.* One is typically inspired by academic staff, while the other will more usually be generated by students. The staff-initiated changes are those which give rise to new forms of teaching practice: here we have specifically in view the pedagogic innovations which affect the operations of the basic unit, in whole or in part, rather than those which are restricted to the individual level.

Examples would include the adoption of project work as a significant component of the undergraduate curriculum; the exploitation of small-group techniques in place of lectures; the development of independent learning schemes; or the introduction of substantial elements of "concentrated study" in which one particular topic is pursued exclusively—that is, with no other competing courses—for a sizeable block of time.

The main characteristic of student-initiated changes, understandably enough, reflects the basic currency of undergraduate life. The individual norms of students are strongly conditioned by the system by which they are assessed for degree classification. So for them, a major source of improvement in job satisfaction must lie in a reduction in the anxiety caused by examinations and other forms of assessment. The number of changes in assessment procedures over recent years suggests that the aca*demic world has recognized the* legitimacy of student views in this domain. The majority of innovations—such as the increasing emphasis given to course work assessment, the introduction of "take-away" and "open book" examination papers, and the availability in some programmes of alternative methods of assessment between which individual students may choose—have originated in some form of student initiative, whether based on confrontation or negotiation.

Here, of course, the mechanism is somewhat different from that for staff-initiated changes, since it focuses predominantly on change in the operational mode.

There is no reason whatever why academics, any more than other people, should embrace novelty merely for the sake of novelty. If a particular course is attracting a large surplus of good, well-qualified applicants, and the teachers responsible for that course are well satisfied with it, then they should not be expected to tinker with it merely as the behest of a self-in*struction enthusiast or a devotee of* inter-disciplinary inquiry.

We noted earlier that institutions and basic units sometimes introduce major curricular reforms in response to the need to attract students to newly established programmes or courses which are relatively low on the pecking order of recruitment. The other side of the same coin is that the higher up the ladder of disciplinary prestige a particular group of teachers may be, and the more reputable their institution, the less likely they are to want to institute any far-reaching innovations in curricula or teaching methods. If well-established basic units often appear stable and conservative, this could be because a natural corollary of satisfaction with one's own status is satisfaction with the *status quo.*

Nevertheless times change rather faster than institutions, and outside the world of higher education, political fashions and economic climates come and go with little *regard for the well-being of academe.* Whether or not externally derived innovation is thought to be a good thing, it is arguable that it has always been an endemic feature of the relationship between higher education and its wider environment.

It may be helpful to distinguish between four broad types of change stemming from outside the system. (All of them should be seen as quite distinct from the internally inspired pedagogic and curricular changes discussed above.) The first two impinge mainly on the operational mode; we shall label them respectively as "innovative" and as "prescriptive". The third and fourth mainly affect the normative mode: we shall refer to them as "radical" and as "evolutionary".

By inexorable change we mean that type of adjustment which institutions, or basic units, or even individuals find themselves being forced to make in their pattern of everyday activity as a result of external forces which are largely or entirely beyond their control. One example at the institutional level would be the way in which the pattern of first-year teaching would have to be reshaped if there were a major change in school sixth-form curricula and examinations; an example at the level of the system as a whole would be the changing recruitment pattern, age distribution of students and course structure resulting from the demographic decline in the early 1990s.

We have already mentioned numerous examples of inexorable change (chemistry, classics, and so on) at the level of the basic unit. Such innovations tend to be viewed in somewhat the same way as minor natural disasters—that is to say, they are accepted in a fatalistic spirit rather than actively resented. They may have only a negligible, or at most an indirect and gradual effect on individual or collective norms, but even where the old values remain intact they will be played out in a very different way in the operational mode. There is no contesting the effectiveness of this kind of change: it is change for survival.

In contrast, what we have called prescriptive change meets with neither success nor acceptance. It constitutes that type of innovation—usually involving some major organizational overhaul—which is projected for some reason or another by a more general on to a more specific level in the system.

Our next category, of radical change, probably needs little explanation. It is normative in its emphasis—that is, it focuses primarily on values and only secondarily on forms of organization or patterns of activity. One example at the level of the system would be the attempt to infuse the polytechnic sector with a distinctive ideology; *another at the level of the institu*tion the endeavour by students to establish their right to participate in policy decisions.

In the majority of such cases, innovative ideas are likely to founder because they go too far in challenging established assumptions. Those who prefer to hold to the existing norms, and who thereby emerge as opponents of change, are not necessarily to be dismissed as obscurantist. They may quite reasonably estimate the costs of abandoning known values as greater than the benefits of espousing unknown ones.

Finally, we come to evolutionary change. This again makes its main impact in the normative mode: but its distinctive characteristic is that it succeeds in maintaining a strong continuity of values in one direction while introducing a significant discontinuity in another. Thus, the Open University won acceptance at least in part through its clear determination to match the standards of excellence of more conventional United Kingdom universities.

Taken together, our four categories of externally generated change suggest a somewhat negative stance on the part of academia and the academics towards innovative ideas. The numerous examples we have cited of internally initiated change at the level of curricula and teaching approaches should help to offset the static and unresponsive image which higher education might otherwise seem to project.

Nevertheless, it remains the case that many changes, including those generated from within, fail because they are unable to accommodate to existing structural constraints.

Academic structures and regulations for the most part evolve to protect the legitimate interests of researchers and teachers. They help to define, and *also defend,* the main areas of professional concern within an institution. But once established, they can prove surprisingly intractable. Even when an innovative idea is generally accepted on intellectual grounds, it may face severe difficulty if it appears to conflict with conventional practice, or to cut across some existing organizational arrangement.

Its eventual success will depend not only on collective agreement among those likely to be directly involved in its implementation, but also on a sufficient persuasion of those whose role it is, at the institutional level, to monitor and approve the resulting activity. The latter may see the enterprise as threatening to their own interests or as demanding of resources which they are not themselves prepared to yield up, and those whose normative task it is to ensure the maintenance of proper standards may veto the proposals as providing insufficient evidence of academic rigour.

On this analysis, the conservatism attributed to British higher education is somewhat exaggerated by its critics. We have argued it is given mainly from contextual rather than from personal factors. It cannot, as is often claimed, be ascribed to the fact that academics are inherently reluctant to depart from the ways in which they themselves reached intellectual maturity. The main constraints on change are social, not psychological: they depend more on the way the system operates than on the particular stand that individual members choose to take.

This edited extract is from Process and Structure in Higher Education by Professor Tony Becher and Professor Maurice Kogan, published by Heinemann Educational Books, price £12.50.

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BOOKS

Theories of language and meaning

An Introduction to the Philosophy of Language
by Bernard Harrison
Macmillan, £12.00 and £5.95
ISBN 0 333 12044 2 and 12043 4

Grammar in Philosophy
by Bede Rundle
Clarendon Press: Oxford University Press, £14.00
ISBN 0 19 824612 9

Linguistic Communications and Speech Acts
by Kent Bach and Robert M. Harnish
MIT Press, £12.40
ISBN 0 262 02136 6

Beyond the Letter: a philosophical inquiry into ambiguity, vagueness and metaphor in language
by Israel Scheffler
Routledge & Kegan Paul, £8.50
ISBN 0 7100 0315 3

Expression and Meaning: studies in the theory of speech acts
by John R. Searle
Cambridge University Press, £8.50
ISBN 0 521 22901 4

by Philip Pettit

There are two obvious ways to construct an introduction to such a live subject as the philosophy of language. One would be to write discursively on the major issues in the subject, relying on footnotes for the links between opinions and persons. The other would be to describe in documentary fashion the different individuals and doctrines at present dominating the field, allowing such common issues as there are to emerge spontaneously.

Bernard Harrison chooses neither way in *An Introduction to the Philosophy of Language.* Instead he treads a loosely laid path designed to enable him both to set out the issues in philosophy of language *and* to establish a gallery of important titles in the subject. The result is a romp through recent literature. Although it will be entertaining for practitioners of the discipline, and enlightening for apprentices, a romp is none the less a romp. And when the leader is someone of Harrison's intellectual robustness and individuality it is a little disappointing that we are not offered a more bracing introduction to the subject.

Harrison's book, let it be emphasized, is a good romp; it is also indeed the only one of its kind available. The trouble comes in drawbacks which are practically inevitable in the sort of exercise undertaken. To mention but two, we are taken in a rather jumpy fashion between issues which are not very intimately related but which just happen both to be discussed under the title of philosophy of language; and we are ushered from one thinker to another, the passage in often made to seem justified by criticism of the figure we are leaving which is too cursory to serve a useful pedagogical or philosophical purpose.

Philosophy of language is not a single subject in the manner of philosophy of science or even philosophy of mind. The rival theories often do not address themselves to common problems, but happen more or less incidentally to engage with one another in the pursuit of their respective goals. Thus it is not possible to lay out the names of Austin, Chomsky, Davidson, Frege, Grice, Quine and Wittgenstein against a checklist of possible positions on a set of systematically related problems. The approaches represented by these figures are not so much competing theories as rival research programmes, where what brings the programmes into rivalry is as often divergence of interest as it is difference in opinion.

The variety in philosophy of language can be nicely illustrated by reference to Bede Rundle's *Grammar in Philosophy.* In any area of inquiry that was directed by a modicum of common purpose, a book so much at odds with the claims of the leading contemporary thinkers would have to be declared idiosyncratic. As it is, the work serves to illustrate the diversity in question. Rundle rails against the high theoretical ambitions commonly espoused, if variously pursued, by contemporary figures such as Chomsky, Grice and Davidson. He calls instead for a return to low-level analysis and assortment such as used to be associated with a certain Wittgensteinian approach to the philosophy of language.

John R. Searle.

Rundle is no theoretical luddite. What inspires his call for a change of direction in philosophy of language is a commitment to an intellectual task different from the jobs pursued by those he pillories. His avowed goal is to characterize the behaviour of certain linguistic terms which generate puzzlement, and to do so in such a manner as to relieve that puzzlement. Granted this target, it is not surprising that Rundle should take exception for example to the approach of Davidson. For Davidson's ambitions are not easy to relate, even if they are not unrelated, to the goal described. Davidson takes his starting point from a specific problem, which is that we finite minds are each capable of understanding sentences in our language. His approach to the problem is to try to describe a certain finite theory such that someone who knew it would be able to interpret each of the sentences in the language. Little wonder then if the account of terms which is suggested in his theory diverges from the account that Rundle would recommend.

But it must be said that even for someone unsympathetic with his project, Rundle's book may be found worthwhile. Its guiding maxim, declared in his opening sentence, is "Philosophy may begin with wonder, but *it soon ends up in* confusion". His claim at the end of the book is to have unravelled some such confusions: in the Wittgensteinian metaphor, to have condensed a few philosophical clouds into drops of grammar. The claim will not seem to every reader to be substantiated, but it will be found worth the effort of investigating. On the range of topics traditionally discussed in philosophical logic, the book has plenty of interesting things to say. Taken in one extended reading it may prove difficult to digest, but it is something which it should be useful to dip into on appropriate occasions.

One could hardly imagine a book on the philosophy of language which is more sharply contrasted with Rundle's than Kent Bach and Robert M. Harnish's *Linguistic Communication and Speech Acts.* This book is an attempt to develop a systematic account of how it is that we communicate with one another, and *what forms such communication* may take. The authors reject the claim made by L. Jonathan Austin, and systematically developed by John Searle, that speech acts are typically conventional, and that this is sufficient to explain how they effect communication.

They adopt a strong psychological model, under the influence of H. P. Grice, according to which a speaker communicates by providing his audience with the means of inferring his attitude, where the fact that this is what he is doing is also intended to be recognized by the audience and indeed to serve as a reason for their drawing the appropriate inference. This model they develop with admirable persistence, deriving much more detailed accounts of the *varieties of communicative* act than are presently available in the literature.

Though Bach and Harnish's book deserves admiration for the systematic nature of their theorizing, the explanatory claims they make on behalf of their theory will cause amazement. They take their psychological model, not as an account *of how communication* might occur in an ideal world in which people could sustain indefinitely complex intentions, and make inferences about the intentions of this kind that they maintain on one another's regard; rather, they take it as a realistic description of how our thought processes actually work in communication, and in the construal of communication. This interpretation of the *model flies in the face* of the apparent facts and requires detailed justification. Unfortunately such justification is not forthcoming. All we are given is blunt assertion, something that is particularly surprising since the issue has been widely debated by philosophers in the past decade.

Israel Scheffler's and John Searle's books are both collections of essays: Searle's explicitly, since all of the pieces have appeared elsewhere, and Scheffler's, in so far as he offers us a set of more or less independent studies on ambiguity, vagueness and metaphor. Both philosophers have theoretical axes to grind. Searle is committed to showing the essential correctness of the scheme developed in his book *Speech Acts,* published in 1969. Scheffler is committed to defending nominalism, and in particular to making do without any linguistic elements other than particular inscriptions: this means making do without meanings, for example, or propositions. But their respective *theoretical orientations* do not intrude very obviously on the topics they discuss and each offers us a set of studies in which anyone may expect to find intellectual substance and sustenance.

It is an indication of the quality of the two books that they each have interesting views to offer of metaphor, the one topic with which they both deal, and in the remainder of this review I would like to describe their treatment of the subject. Scheffler construes the problem of metaphor as the problem of explaining how a metaphorical expression is given an extension, a range of application, which is different from that of its literal counterpart but which is still connected with the literal extension: if it were un*connected, he points out, the two* expressions would simply be a pair of homonyms. He marshals existing positions on metaphor, and some positions that he invents, around this problem, coming up in the process with a useful taxonomy.

Altogether he distinguishes six approaches to the problem. The intuitionistic one refers, unhelpfully, to intuition in explaining how a metaphorical expression is given extension. The emotive, at least in its extreme form, denies that there is any extension to be described, arguing that what makes an expression metaphorical is its affective overtones: this *differentia* Scheffler disposes of without difficulty, since emotive force is neither necessary nor sufficient for metaphor. The formulaic approach, *and it may take* many forms, claims that there are principles by which metaphorical extension is derived from literal: Scheffler examines the common version, which takes similarity as the operative principle, and indicts it of vacuousness. Finally Scheffler criticizes two approaches associated respectively with Monroe Beardsley and Max Black. The first, the intensional one, claims that where the primary meaning of an expression yields its literal extension, the secondary meaning, the so-called "connotation" of the term, fixes its metaphorical extension. The second, the interactional approach, says that the metaphorical extension is fixed rather by a sort of interaction between the idea of that to which the *term literally applies and the idea* of that to which it is applied in metaphorical usage. Both theories would offend against Scheffler's nominalism but he finds independent ground for rejecting them: namely, that the mechanisms specified, however understood, would not in fact fix the right extensions for metaphorically used expressions.

The approach Scheffler himself adopts, the sixth in his taxonomy, is a contextual one that he derives from Nelson Goodman. According to this, it is not by inscrutable intuition, nor by formula, nor indeed by reliance on some intensional or interactional mechanism that one sees the extension of a metaphorical expression. Rather it is by reading the many cues which any context of usage supplies for the construal of metaphor. In particular, the context should tell us what the predicates are that define the similarity between the object metaphorically characterized and the entities to which the literally used expression applies, and those predicates should then enable us to see the extension of the metaphorical expression. For example, the context should tell us that, used of a person, the expression "is a wolf" has the extension fixed by such predicates as "is fierce", "is treacherous", "is a wily", and so on.

The resort to context, it may well be felt, is no more helpful than the appeal to intuition. Scheffler is perhaps a better taxonomist of metaphor than he proves a theorist of the subject. And what then of Searle? Well, the approach he represents probably counts most naturally as what Scheffler would call a formulaic one. But it is a formulaic approach with a difference, for Searle, unlike most more than invoke similarity in describing principles by which, allegedly, we fix the extensions of metaphorical expressions.

According to his theory, there are three stages in the understanding of metaphor. First we must recognize that an expression is used metaphorically; secondly, we must work out a set of possible extensions for the expression so used, each extension being given by a set of determining predicates; and thirdly, we must recognize which of these extensions is the appropriate one for the utterance in question. Searle is happy to appeal to our sense of context in explaining how we go about stages one and three but he feels that we rely on general principles at stage two and that these call for characterization in any theory of metaphor.

He identifies eight principles in all, eight principles whereby given a literal predicate "is P" we might work out another literal predicate "is R" such that the extension of "is R" is the same as the extension of "is P" metaphorically used. Examples of proposed principles are: *things which are P are by* definition R; things which are P are saliently but contingently R; things which are P are often said or believed to be R. Searle's effort in working out these principles is a brave one but, as he himself comes close to admitting, it tends to peter out in a crucial class of cases. If I say "Sally is a block of ice", how is the extension of the metaphorical expression fixed; how is "R" computed? All that Searle can offer is this: "It is a fact about our sensibility, whether culturally or naturally determined, that . . . P is associated in our minds with R properties" (page 108). As in Scheffler's case, we might comment: not with a bang but a whimper.

The theories offered by Scheffler and Searle are both what we might describe as indirection approaches to metaphor: theories which depict metaphors as indirect ways of saying things which can also be said more directly, if only more cumbersomely. In conclusion we may note that there are at least two other major kinds of treatment *given to the subject: it is a fault* in Scheffler's taxonomic principles that these do not naturally come to view in his scheme. The one is the intimation approach, recently explored by Donald Davidson, which represents metaphor, not as the assignment of an item to a metaphorical extension, but rather as its assignment to the literal one, the assignment being so incongruous as to have interesting effects on the hearer, though not just the effects mentioned in the emotive theory. The other approach is the innovation one, according to which a metaphor does involve assignment to a non-literal extension, but an extension which we may not be capable of picking out by means of any literal predicates. I suspect that despite Scheffler's characterization of their views, both Max Black and Nelson Goodman have sympathies with this understanding of metaphor.

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BOOKS

The radicalization of Cromwell's army

The Rise of the New Model Army
by Mark A. Kishlansky
Cambridge University Press, £15.00
ISBN 0 521 22751 8

The New Model Army has certainly not suffered neglect at the hands of historians of the English Civil War. Writers as diverse as Gardiner, Firth, Haller and Hill have left us in no doubt as to its importance as a military machine, as an irresistible political force, and as a powerful and persuasive religious pressure. The New Model Army has been hailed as a major military innovation, fundamentally different in its nature from Parliament's earlier local or regional armies. Above all, however, its name has become a byword for the radicalism of the English Revolution, and as such it has been viewed as the essential power base from which Oliver Cromwell proceeded to overthrow both King and Parliament.

Such simplistic views of the New Model Army disintegrate in the light of Mark Kishlansky's brilliant and thought-provoking book. Kishlansky bases his research firmly on the primary sources—including the newly discovered journal of Thomas Juxon, a London militia captain—and makes sparing use of "obviously biased informants" such as Baxter and Edwards and of memorialists like Clarendon, Ludlow and Hutchinson who, though contemporaries of the events they described, wrote in distorting retrospect.

In addition he avoids the "theoretical skirmishing" around labels, stereotypes and categories in which a number of earlier writers on this period have unproductively exhausted themselves. Nor does he have much to say about the Levellers who have been raised to "fantastic heights" by recent historiography and whose natural habitat the New Model Army has usually—and in Kishlansky's view, mistakenly—been regarded. What he succeeds in doing is refreshingly original, and that is to delineate the ways in which, and the reasons why, the New Model Army underwent a basic political transformation in the course of 1647.

His thesis is that the New Model Army was not politically radical at its inception. Indeed, it was not primarily political in any sense at all. Called into being for strictly military reasons, the New Model in the first fifteen months of its life was an army, no less and no more, without political aspirations or influence of its own. It was not *strikingly different* even in a military sense from what had gone before.

In its composition, its form, and its finance, the New Model Army differed little from its predecessors. . . . Reorganization of the Army had little effect upon military decision making. . . . On the whole, the sparse number of replacements demonstrates a remarkable stability among the Army's ranking officers. Promotion was almost certainly determined by the seniority system. Conservatism and continuity were the keynotes in most respects though its discipline and (initially, at any rate) more or less regular pay were unusual features. It was not at first more "professional" or "national" than Parliament's earlier armies.

Kishlansky's attack on the myth of the New Model Army proceeds still further, however, since he finds little firm evidence to support conventional views on its religious leanings and significance.

The original remodelling of the officer corps was undertaken with military not religious considerations in mind; support for Presbyterianism did not automatically lead to cashiering. Men of different denominational persuasions peacefully coexisted within the army's ranks. Army chaplains were always in short supply.

Sir Thomas Fairfax, the first commander of the New Model Army.

Religious radicalism may explain some of the soldiers' self-confidence and enthusiasm but its transcendent character is irreconcilable with the constitutional limitations the soldiers placed upon their action. One by one the religious extremists defected from the Army, precisely because of its secular domination.

Although not inherently radical at the start, the New Model Army, Kishlansky argues, was radicalized in the course of 1647. The preconditions of the ideological development and political radicalization of the army were many and various. Religion may have contributed to a limited extent, but other factors—the expansion of the electorate, the growth of literacy, education and legal consciousness—were more directly connected. In the short term the author sees the radicalization of the army as a response to the harsh economic pressures of increasingly irregular pay, to the attempted disbandment and part-transfer to Ireland, to fears of judicial retribution, and to a vigorously defended sense of honour in the army and pride in its achievements. "In a series of unorganized and conflicting responses aroused by pressures that emanated from Westminster, the Army acquired political awareness."

In his assessment of the factors leading to the radicalization of the New Model Army, Kishlansky places a great deal of emphasis on the noticeable shift at Westminster from consensus to adversary politics which weakened the status and authority of Parliament.

The commonly held concept of a unified and organic political order had been violated by the rise of party and interest at Westminster, prompting forces outside Parliament to enter the political process and attempt its amelioration. . . . The Army's entrance onto the political stage signalled the demise of parliamentary politics. . . . The rise of the New Model Army was the harbinger of the emergence of radical politics that transformed civil war into revolution.

Conceived in this way Kishlansky's study inevitably extends far beyond the apparently limited region suggested by its title. This is a book about the nature and methods of politics in mid-seventeenth-century England (note, for instance, his important reappraisal of the political career and policy of Denzil Holles) about the tensions which developed at the various levels of the three-sided relationship between Parliament, London, and the army, and about the complex connections between religion and politics. Kishlansky not only offers a great many convincing reassessments of his own but in succeeding so impressively in *The Rise of the New Model Army* demonstrates the need for further research and revisionism in other quarters.

R. C. Richardson

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Police in a paternalistic society

The Police of Paris 1718-1789
by Alan Williams
Louisiana State University Press, £15.00
ISBN 0 8071 0491 4

Alan Williams's book might be described as a Baedeker's guide to the Cobb country. Richard Cobb has given us memorable pictures of some of the curious inhabitants of this vanished land, the people on the margin of society, whose anonymity his insight has so often penetrated. Here we have the official side: the organization and the men who controlled, punished—and surprisingly often helped—those unable or unwilling to help themselves, at least in ways that society was prepared to accept.

This excellent study deals in lucid and intelligent detail with both the structure of the Paris police and the range of its activities. In the process, Professor Williams has something to say that will interest almost anyone concerned with any aspect of Parisian life in the eighteenth century, from the fate of Manon Lescaut to the operation of political influence at the highest levels of Versailles society.

The first part of the book deals with the organization of the different sections of a police force that employed over 3,000 men by 1789, and, in particular, with the *Lieutenant de Police* who was in charge of the force. Wherever one turns; to the career structure by which ambitious men attained this quasi-ministerial position, or to the siting of fire-fighting appliances, Williams is waiting, with pertinent information on the cost of an office or the advantages of state control of the pawnshops. His 19 maps of Paris, showing the location of different services, would be even more informative if they were easier to read, but this is a minor criticism. Students of crime and its repression will find this a splendid case history. Anyone concerned with how ancien régime society actually worked could not ask for a better analysis of one particular institution, from the man at the top right down to those, whose humbler aspirations were limited to getting permanent jobs as police informers.

Social historians, especially British ones, will be staggered by the range of activities undertaken by an energetic *Lieutenant de Police*. Whether or not they ordered these matters better in France, they certainly ordered them differently. In addition to the prevention, detection and punishment of crime, the police of Paris provided its inhabitants with a free fire service. In a paternalistic society, they were responsible for the control of ideas as well as that of information; they aspired to know whatever was being discussed in salons, in cafés and in family circles. This seems to have been rather less sinister in practice than it sounds in theory. Intelligent police officials liked to spread the impression that their agents were everywhere, but they were more concerned to deter than to punish. Quite often they disappointed fathers, husbands and wives who wrote to beg them to lock up the more obstreperous members of the family.

In addition to supervising street cleaning and matters of that kind, the positive role of the police in public health was truly extraordinary. They defeated the attempt of the Paris *Parlement* to prevent vaccination, set up a clinic for the treatment of venereal diseases and awarded prizes for new drugs or medical treatments. They distributed a great deal of charity, either through the clergy, or in the form of public works. The bureau they provided for the regulation of the wet nurse industry employed about 50 people. They enforced price controls on the food trade, subsidized bakers and even sent their own agents into the provinces to buy cattle when meat looked like running short. All this is a useful reminder that paternalism, however much it might irk the radical writers, had perhaps more to offer to the ordinary man than the laissez faire of a later period. The attitudes of the police to the different social classes were also different. They were, of course, respectful towards *les grands* and knew better than to interfere with those who enjoyed high political protection, but they were not particularly well disposed towards merchants (whom they suspected of profiteering), they regarded soldiers as a potential nuisance, and ordinary working men—as distinct from vagrants—as the law-abiding subjects the most of them were.

Reading Professor Williams's perhaps very optimistic view of everyday life in Paris—he is, after all, seeing it through the eyes of policemen anxious to show what a good job they were doing—one is struck by the similarities and contrasts between the ancien régime and the Terror. After two or three years of unaccustomed liberty, Parisians must have found the return of controls familiar, in some respect reassuringly so. Once again, "they were responsible: for keeping the capital fed, for providing employment and in general for seeing that everyone conformed to the rules. If that implied censorship, informers, the close supervision of who lived where, and general busybodying, there was nothing new about that. During the Terror, of course, it was all much more fearsome and the penalty for a little misplaced drunken eloquence would have horrified the policemen of former days, but the idea that authority was, and indeed ought to be, responsible for all that went on in the city, owed nothing to revolutionary ideology.

This is a fine book. Professor Williams has shone his bull's eye lantern into a great many earlier corners. It must have paled called for a good deal of self-denial not to explore the peculiar goings-on he discovered there: why did the widow David throw water at a confiding a son returned him to daughter? Rather sternly, he resists the temptation to lose himself in these tempting alleyways. No doubt this is all for our good; in a book of this kind, but one cannot help hoping that, sometime or other, he will let us know.

Norman Hampson

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BOOKS

A covert tradition of women writers

The Madwoman in the Attic: the woman writer and the nineteenth-century literary imagination
by Sandra M. Gilbert and Susan Gubar
Yale University Press, £15.75
ISBN 0 300 03286 7

This large, ambitious, copiously researched and copiously written book seeks to track a major tradition in women's writing in the nineteenth century. It is a tradition which is necessarily hidden since its resources, Sandra Gilbert and Susan Gubar suggest, are the covert acts of disaffection expressed in the fiction-making process of poetry and the novel. The authors argue that women's creativity has been fuelled by the energies of rage against patriarchal society and against the authority of the male writer as much in the work of apparently acquiescent or tolerant writers like Jane Austen and George Eliot as in the estrangement of Emily Brontë or Emily Dickinson.

Because the tradition they perceive is covert, the surface meaning of the text becomes for them often something suspect, becomes even an actual antagonist. They emphasize enclosure, doubling, the concealed and the destructive, and the work as a whole assumes that texts are symptomatic and, in novels, that all characters may be equally expressive of the author.

Mrs Norris in *Mansfield Park* is, they remark, one of "these bitchy women [who] enact impulses of revolt that make them doubles not only for the heroines but for their authors as well". And they suggest that there are clues that align the author with the dislikeable Rosamond Vincy in *Middlemarch* who is always sewing and doing crochet: "In short, like Eliot, she is a spinner of yarns, a weaver of fictions". The first of these two examples illustrates one of the strengths of this book: its reawakening in us of the passionate experience of *writing*. It makes us aware of the involvement of the writer in all the language and all the activities of her text. The second example shows one of the book's weaknesses—an often cavalier use of punning. Puns clearly have a function in analysing hidden levels of the text; they can shift the lurking sense into the open and discharge the sealed significance of a word. Some of the puns in this book work like that and well. Freud's analyses of jokes and of negation are crucial to the methodology, but too often the puns act to conceal separateness rather than reveal secret kinship. So, we move from "needles" to women who are "needlers" and the book opens with a flourish: "Is a pen a metaphorical penis?" There is a degree of playfulness here which is attractive and yet the easy collusions of sound which give a swashbucklingly Joycean tang to the first page won't take us much beyond a joke. The question won't go on to yield serious meaning. For one thing, there's the awkward fact that the joke won't work in other European languages since the etymology (pen-penna-feather) is manifest in German (feder) and French (plume). Is a penis a metaphorical feather?

The kind of slippage between levels of argument permitted by puns is striking also in the frequency with which phrases like "in some sense", "in a sense" and "in other words" appear, particularly in the theoretical sections, while words like "suggest" and "subvert" exercise their hidden authority by persuading us not to object lest we become part of that which is to be subverted. But "in other words" is also a phrase which takes us into one of the book's best enterprises. The authors are adept at picking up the half-submerged literary allusions in a text and showing how such references often question the authority of the masculine source or undermine literary assumptions while the surface of the book keeps calm. The chapter on Jane Austen's juvenilia "Shut Up in Prose" shows with great relish how she dismantles the rhetorical effects of earlier fiction and demurs at their topics, while never abandoning her respect for the novel: "The novel is a status-deprived genre, Austen implies, because it is closely associated with a status-deprived gender." The chapter on Milton's presence for women writers is genuinely innovative.

The astuteness of much of the observation protects Gilbert and Gubar to some extent from the dangers of sentimentality. But they do not always resist the temptation to naturalize those men they approve into females. They offer a heartening defence of the characterization of Will Ladislaw in *Middlemarch* as "Eliot's radically anti-patriarchal attempt to create an image of masculinity attractive to women" but we are then told that he "is also feminine because he is an outsider in his society". What then are we to make of Heathcliff in *Wuthering Heights*—like Will, an outsider and dispossessed, but a more difficult subject for feminization?

A similar sentimentality occurs in their romantic assumption that nature is gendered, and female. It's a hallowed personification, of course—Dame Nature at her work. But in a book so alert to masculine designations of roles to women it comes as a surprise to find the authors adopting it so comfortably, and writing: "Yet, just as interlacing and entwining belong to the female realm, so does unravelling, which is done at night not only by Penelope but also by nature herself, so as to insure [sic] the eternal freshness of things." What does this *mean*? What does nature do at night and why should we impute to it such benign intent? Why should we adopt nature as a sister? The ascription here is clearly being used as a way of claiming authority for specifically female functions by aligning them with natural processes, but that is precisely the kind of argument frequently used to assign and keep women to "their proper sphere". I prefer George Eliot's ungendered description of nature as "the great tragic dramatist" or Fay Weldon's Praxis with her salutary warning: "Nature our Friend is an argument used, quite understandably, by men".

In their preoccupation with femaleness the authors are inclined to overlook ways in which women writers challenge circumscription through male characters, and in their scrutiny of the obverse they often fail to see what is creative in the obvious. Throughout the eight pages devoted to the topic of weaving, interlacing and entwining in George Eliot's work, for example, there is no mention of the working handloom weaver, Silas Marner. Weaving, by the century in which George Eliot wrote, was by no means a task specific to women. Perhaps Silas Marner is excluded from the discussion because he cannot be claimed to be, as they half-jokingly suggest for Frankenstein's monster, a woman in disguise. Perhaps he is not there because he is too manifest.

But in Silas Marner George Eliot offers a striking and poignant study of a man who moves outside ascribed roles and takes on what his community sees as women's tasks. He tends and rears a child, a girl moreover, as sole parent and through this task life is restored to him. To some extent, perhaps, the challenge implicit in such a description by a woman writer is limited by Silas's oddity, his celibacy, his f-lling sickness. But the book gives a rare image of other possibilities than the male-female polarization of work-domesticity and is serenely free of either prudishness or pruriency in its account of Eppie's rearing. The radical value of such equanimity can perhaps be better gauged if we imagine what Dickens might have made of such a theme.

Both the excellent insights and the substantial weaknesses of the book come from the repudiation of what is manifest. It brings with it a repudiation of commonality beyond that of gender: it ignores the shared predicaments of people living in a historical period. So, enclosure in this book refers always to the social and psycho-sexual problems of women and never to the conditions in working-class houses and destitute cellars described by Elizabeth Gaskell (a writer notably absent from their discussions) nor to the problems of commonlands and landlords described by Maria Edgeworth.

This is a major fault since their declared starting point is an examination of "a common, female impulse to struggle free from social and literary confinement through strategic redefinitions of self, art, and society". The opening of the chapter on *Shirley*, "The Genesis of Hunger According to *Shirley*" seems at first to be about to undertake an examination of the interconnexions between "the scanty dinner baskets of child labourers, and the starvation of the unemployed" and "women furnished for a sense of purpose in their lives". But it soon becomes clear that the starving children and unemployed are, in Gilbert and Gubar's view, to be *read through*—to be seen as essentially allegorical of women's—and specifically Charlotte Brontë's—psychic hungers.

In one of the few references to Elizabeth Gaskell, indeed, they follow Ellen Moers's lead in pairing *Mary Barton* with *Uncle Tom's Cabin* as works which "submerged or disguised" female resentment "in ostensibly disinterested examinations of larger public issues". And they continue:

> More recently, even Virginia Woolf's angrily feminist *Three Guineas* purports to have begun not primarily as a consideration of the woman question but as an almost Shelleyan dream of transforming the world—abolishing war, tyranny, ignorance, etc—through the formation of a female "Society of Outsiders".

"Purports?" "Ostensibly disinterested"?

The assumption here seems to be that political activism in women writers is merely a disguise, a refusal to acknowledge their real topic, which is to be always and only the psycho-sexual problems of women. This insults women. Although the authors pay lip-service to the relations between the position of women and all the coercive structures of a society, their method is too reflexive to acknowledge that women's rage at their own position may be part of a larger rage which is disinterested. Elizabeth Gaskell recorded that the starting point of *Mary Barton* was when a workman said to her while she was attempting to speak comfort: "Ay, ma'am, but have you ever seen a child clem [starve] to death?".

"I am to be always at home?" asks Clara Middleton in *The Egoist* with a sinking heart, trapped in her engagement. It would be ironic indeed if feminist criticism were to place women again in that position—with no possibility of *going out*. There are other shapes for women's experience and creativity besides the reflexive eternal O of the orifice and the womb. By the time I had finished reading this learned, revealing, but in many ways reactionary book, I found it very necessary to remember that.

Gillian Beer

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When Greek meets Roman

Tibullus, a Hellenistic Poet at Rome
by Francis Cairns
Cambridge University Press, £20.00 and £7.50
ISBN 0 521 22413 6 and 29683 8

"Hellenistic", as an adjective to describe Greek language and culture between the time of Alexander the Great and the first century BC, is a particularly useful term, first coined by J. G. Droysen in the last century. The object of this book is to link the Latin elegiac poetry of Tibullus, who lived in the reign of Augustus and died in 19 or 18 BC, with the principles and practice of Hellenistic Greek poetry which in turn is seen by the author as "a concentrated reworking of early Greek poetry". Readers of Cairns's previous work—*Generic Composition in Greek and Roman Poetry* (1972) and numerous articles—will have admired his wide-ranging scholarship and imaginative approach to literary issues, and they will not be disappointed by this latest product of his *ingenium*.

The chief mark of Hellenistic literature is a keen interest in diverse learning—history, mythology, geography, astronomy, medicine, winds and weather, plants and animals. Tibullus reflects this kind of interest by handling besides erotic experience both heterosexual and homosexual, such themes as religious antiquarianism, the countryside, piety, and the praise of poverty, simplicity, and smallness in a rustic estate. Cairns very illuminatingly pursues motifs and concepts backwards and forwards between the early and late periods in Greek literature and the poetry of Augustan Rome.

But perhaps the Greek connexion is sometimes overemphasized. A native Italian literary style certainly did exist which, though probably influenced by Greek models, was nevertheless not merely imitative. This is demonstrated by, for example, the fondness of Latin for alliteration right up to the Augustan era, a phenomenon not nearly so common in Greek. In the chapter entitled "Verbal Learning" Cairns rightly states that Tibullus, "like every other Greek and Roman Hellenistic poet", shows a constant interest in the meaning and use of words. But this was a long-established feature of Latin, as we see from Plautus in whom, along with alliteration and rhyme, examples of *figura etymologica* (the collocation of two or more words from the same stem) abound. Word-play of this sort is actually a favourite device of Latinity at large, and the reader ought to have been advised of the fact.

Of the features not present in Hellenistic poetry but found in Tibullus, the first is the scope of his assumed erotic *persona*. The exact history and development of Roman elegy are still controversial questions, but in his final chapter Cairns, like many another suitor, attempts to bend the bow: "The importance of the subjective erotic frames of Hellenistic narrative elegies lies in their relationship with the narrative content." The Greek elegiists were emphasizing analogies between themselves and their heroes and in so doing they created or implied poetic *personae* for themselves. This encouraged the Roman elegiasts "to identify rather than analogize and to expand the process of subjectivization by adding to their own erotic *personae* all the emotions and experiences of the love-sick heroes of Greek narrative erotic elegy". A sophisticated but persuasive suggestion concerning a long-standing problem.

Ancient criticism tended to see Tibullus as the greatest Roman elegist, and this book seeks to explain this on mainly technical grounds. But it is impossible for us, as moderns, to have the same full and direct access to his poetry; for most of us he must probably remain some kind of Roman Longfellow.

H. MacL. Currie

H. MacL. Currie is head of the department of humanities and social studies at Teesside Polytechnic.

Ecology 2nd edition

by Robert E. Ricklefs

". . . writing in a field where insight is generally both of practical experience (Ricklefs) reveals not only an impressive array of scientific information, but a gift for turning it into lucid, attractive and apparently effortless prose".
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writing of the first edition in the Times Higher Education Supplement.

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BOOKS

Marxist theory in the face of new social conditions

Marxism and Class Theory: a bourgeois critique
by Frank Parkin
Tavistock, £6.95
ISBN 0 422 76790 5

Classes, Strata and Power
by W. Wesolowski, with an introduction by George Kolankiewicz
Routledge & Kegan Paul, £6.95
ISBN 0 7100 8845 0

The Future of Intellectuals and the Rise of the New Class
by Alvin W. Gouldner
Macmillan, £7.95 and £3.95
ISBN 0 333 26610 2 and 26611 0

The Intellectuals on the Road to Class Power
by George Konrad and Ivan Szelenyi
Harvester Press, £7.50
ISBN 0 85527 148 5

Having now celebrated the hundredth anniversaries of the birth of the founders of modern Marxism (Marx, Engels, Lenin and Trotsky), it is as well to take stock of the Marxist critique of modern society—not only of the capitalist states of the West but also of the societies created in their name in the East. It is to the credit of the authors of these four books that they all consider industrial society in this perspective and attempt, in different ways, to confront the historical experience of the twentieth century with theories inspired by Marx.

Frank Parkin seeks to refute, and Wesolowski to refurbish, the "classical" approach of Marx and Lenin. Parkin's argument is that the clash between labour and capital which is so central to Marxist thought obscures from view other types of conflict—racial, religious, linguistic, and sexual—which have moved towards the centre of the political stage in many industrial societies. "Any general model of class or stratification that does not fully incorporate this fact must forfeit all credibility."

Parkin argues that the effects of socialist revolution and the domination of classes in Eastern Europe give rise, "at least in respect of the class that really counts", to distributive outcomes similar to the West. Rather than concentrating attention on property ownership he considers the concept of "social closure". By social closure Parkin, following Weber, means the process by which certain social groups (class, occupational, gender, racial, religious) seek to maximize their own rewards and to exclude "subordinate" outsiders from access to resources and opportunities. The advantage of the notion of closure is that it may be applied to a wide range of superior and inferior social strata—traditional caste systems and the stratification of ethnic communities as well as classes and occupational groups.

Parkin is most penetrating and ironic when dealing with contemporary Marxists (Poulantzas and Althusser in particular) who seek to reduce all conflict in the end to the class war between labour and capital. It seems to me that Parkin is often correct in his strictures: authority roles, gender differentiation and ethnic and religious antagonism cannot always be reduced to class antagonism. But it does not necessarily follow that classes as defined by Marx and his followers should have the same analytical status as, say, religious communities.

Exploitation, Parkin argues, is "the nexus between classes and other collectivities that stand in a relationship of dominance and subordination on *whatever* social basis". Yet the Marxist notion of exploitation is more than the sum of privileged access to resources by the ruling class and denial of opportunities to the ruled; it is part of a system of economy involving accumulation of capital. While many commentators on inequality in socialist states have found disparities in consumption between strata similar to those in advanced capitalist states, it is important to distinguish between the sources of disparity and the legitimacy of inequality: proprietary rights have no equivalent in socialist societies.

These basic differences not only affect who benefits under both capitalism and socialism, but also determine access to resources and the ways that the Government may influence distribution. While Parkin recognizes the importance of ownership of property, he widens the concept to include any minority which has access to property to the exclusion of others and which give rise to "important consequences for the life chances and social conditions of the excluded".

Parkin's analysis of class and conflict is less an empirically testable theory than a moral vocabulary: liberal theory conceives of mutual interest, Marxism of irreconcilable contradictions and his own neo-Weberian position is a conceptual model of permanent tension, of "unrelieved distributive struggle". Parkin's mode of analysis provides many useful categories. But he presents the sociologist as a kind of theological salesman hawking around different "conceptual packages", making moral propositions, judgments and recommendations with no general theory amenable to verification, let alone of prediction. This viewpoint would be strenuously contested by the other authors considered here; and of course Parkin lays himself open to the objection that his own intellectual agnosticism is in fact a belief system inspired by his opposition to Marxism. Be that as it may, Parkin's analysis is knowledgeable and provocative: this is a book that should be widely read.

Wesolowski's work, ably translated by George Kolankiewicz, was originally published in Poland in 1966 and is widely used by sociologists there as a basic book on contemporary Marxist theory of class, power and stratification. This book is not an exegesis of the Soviet version of historical materialism; indeed it makes use of non-Marxist sociology developed in Western capitalist countries.

Wesolowski makes two major departures from classical Marxism: he reconciles the notion of a power elite with that of the traditional ruling class; and he tries to incorporate elements of social stratification theory with class analysis. Much of this is not novel in contemporary Marxism, but credit must be given to Wesolowski not only for making these points 14 years ago but also for expressing them in plain language.

Wesolowski considers "class domination" to have three dimensions—economic, political and ideological—the interaction of which establishes the ruling class. The political elite "comprises those who on account of their position in the political structure can make decisions or can directly influence decisions". Where he parts company with many elite theorists is on the role of the dominant class. Anticipating Lukes's notion of the "third face of power", he points out that certain matters are not the subject of discussion by the elites and are outside the scope of political decisions—economic domination, private property under capitalism (and I would add state property and Party hegemony under socialism) are taken for granted.

Under capitalism, Wesolowski argues, a person's relations to the means of production determines a whole matrix of social attributes—income, life chances, status position and prestige. Under socialism, stratification remains but an individual's position in relation to these various attributes is not consistent or crystallized: high income may compensate for low status. Opposing Western functionalists, Wesolowski asserts that differentials of income and prestige are not necessary for the efficient operation of a socialist society and are only transitional in modern Poland. However, authority and hierarchy is necessary. Modern production requires organization and this entails, to quote Engels, "authority and a certain subordination".

It is at this place in the argument that some Western Marxists, most Western liberal critics and Eastern dissidents call into question the whole analysis. True, it is retorted, those holding authority positions are not members of a bourgeois capitalist class, but as their position gives power, status and material privileges they do form a ruling class. Furthermore, income, status and power are structural not transitional and accrue to dominant groupings or classes.

Alvin Gouldner carries this argument one stage further in his stimulating *The Future of Intellectuals and the Rise of the New Class*. He considers modern society to be in transition to the domination of a new class made up of intellectuals and technical intelligentsia, who are in contention for power in capitalist, state socialist and Third World countries. In the West, the new class grows out of the "old moneyed class". For Gouldner, "moneyed capital" is a special case of capital which includes cultural capital gained by the new class through education. The new class is ideologically bound by "professionalism", given social coherence by its distinctive language and is politically united through revolutionary organization: "the 'vanguard' party expresses the *modernizing* and elite ambitions of the New Class".

While Gouldner retains some of the methodological trappings of Marxism, his approach is not Marxist but what he calls Left neo-Hegelian sociology. Gouldner considers the new class to be the "most progressive force" in modern society and a "centre of human emancipation", though it is at the same time elitist and "bears the seeds of a new domination". In the West, the new class is on the ascendancy and the old ruling class of money capital is dying (the United States is one of its last outposts). In Europe, Japan and the socialist states the new class is growing—Eurocommunism and detente are its major political strategies.

Konrad and Szelenyi make some important amendments to Gouldner's new class thesis when considering the structure of East European societies. These dissident Hungarian authors view the new class as the instrument of a "new system of oppression and exploitation of the working class". Under state socialism, the intellectuals—defined to include all persons with higher educational qualifications—form a dominant class. Affinities with Marxism may also be perceived: the class power of the new class is derived from its control of the "redistribution" of surplus product. Its goal is to maximize the extraction of surplus (created by the working class) and to use it to expand the investment-goods industry. Unlike under capitalism, it has no foe in the form of a bourgeoisie which legitimates its appropriation of surplus through ownership. Also, intellectuals in Eastern Europe are strengthened by the bureaucracy and the police: one might define the ruling elites as being composed of a united triumvirate of party ideologue, policeman and technocrat. These authors also echo the Marxist ideal by postulating an alternative society based on legitimate rule by those who create surplus product and they envisage a return to collective wage bargaining by the workers, cooperatives and workers' self-management.

There can be no doubt that the occupational structure calls for analysis with the new white collar professions and semi-professions at its centre: even in a Leninist sense, the technician/technologist now replaces the skilled metalworker of the nineteenth century as the most technically advanced part of the working class. Yet one must question whether the evidence would justify giving the intellectuals/intelligentsia a similar role as an historical force as the bourgeoisie. In the first place, the internal differentiation of this group is great: does the university teacher, the technology, fine art, law and history share a similar world view? And such differences are greatly compounded when one considers the array of occupations from manager, technologist, welfare worker and teacher through to the traditional intelligentsia of creative writer and social critic. True, the advocates of the new class thesis would argue that it is internally differentiated—but have these groups sufficient affinity to pursue a common *class* interest? The character of the ruling elite representing the intellectuals as a class in state socialism is even more open to question. It seems to me to be far from convincing to suggest that intellectuals, ideologues and police may be considered as a unitary power bloc.

What is virtually ignored in these books is any analysis of how decisions are taken and in whose interests they are made. It is at very well for Wesolowski to say that certain issues are not considered by the ruling elites in East and West, but whose interests are totally taken into account? When we pose questions such as: is it in the intellectuals' interest for Soviet or American troops to intervene in Czechoslovakia and Afghanistan or Vietnam and Korea respectively, the answer seems problematic to say the least. In the present economic crisis of Western capitalist states, is it really compatible with the interests of a rising intellectual class that government cuts should hit so hard at the centres of learning, teaching and research? Military and police expenditures, on the other hand, have, if anything, risen during the crisis. Perhaps the truth of the matter is that the new white collar groups have greater potential for political action and control than hitherto, but that they lack an ideology of political opposition, and traditional interests (capital, party, police and military) have more and deeper-seated power than the theorists of the new class would be prepared to concede.

One other general criticism that may be made of all four books is the absence of detailed empirical data. Wesolowski, it is true, does cite some figures on the ascription of truth or falsehood to a mathematical proposition because intelligible. This is, indeed, a dispute that extends beyond the philosophy of mathematics. It is part of the pragmatist tradition, going back for more than a century, that the concept of truth, if it is not to be idle, must be construed in all fields as tantamount to "warranted assertibility". Professor Wright follows the modern fashion, set by his teacher Professor Michael Dummett, of referring to those who take this attitude to truth as "anti-realists".

As Professor Wright, I think correctly, represents him, Wittgenstein sympathizes with the intuitionists against the platonists, but goes still further in the direction of anti-realism. The example which Wright gives to illustrate this is that of Goldbach's conjecture that every even number is the sum of two primes. A platonist would say that this proposition is either true or false, though we do not know which; an intuitionist would deny that the universal proposition had any truth-value in our present state of knowledge, but would allow a truth-value to any given instance of it, since once the number was specified we could calculate the answer if we took enough trouble. Wittgenstein would not have conceded even so much as this, since he held that the result of a process of calculation is never determined in advance. Even though we may be following what seems to us a clear procedure, we cannot predict where it will lead us. We cannot prejudge the question what verdict we shall characterize as correct.

This is in line with Wittgenstein's general view that the extensions of all our concepts are indeterminate. Their employment is, indeed, subject to rules, but our obedience to those rules is like the unrolling of a carpet. The floor is covered only to the extent that the carpet has actually been unrolled. In much the same spirit, Wittgenstein held that a mathematical proof changed the meaning of the concepts in question. "A proof", he said, "is a new paradigm." Here he drew an analogy between the propositions of logic and mathematics, in their capacity as rules of deduction, and conventions of measurement. He was quoted by Moore as saying in a lecture "'3+3=6' is a rule as to the way in which we are going to talk. It is a preparation for description, just as fixing a unit of length is a preparation for measuring". Wright is not happy with this analogy, but expounds it as way of enforcing Wittgenstein's view that "arithmetical propositions, rather than being themselves descriptive of any thing, enter into the fixing of criteria for the application of concepts in terms of which descriptions can then proceed. In this sense they are 'antecedent' to description, and so to truth".

These views would hardly be tenable if the choice of mathematical rules or standards of measurement were altogether arbitrary. They have to be such that their application accords with empirical observation. If I understand him rightly, Wright credits Wittgenstein with acknowledging this point. The empirical observations, as it were, come first and the rules give the sanction of "necessity" to what would otherwise be inductive generalizations. The ascendancy then passes to them, inasmuch as they supply criteria for deciding whether our empirical investigations have been correctly carried out. It seems, however, to be implied, that if there were a constant discrepancy between our empirical results and those that the rules prescribed, it is the rules that would be changed.

The view that the propositions of logic and mathematics "say nothing", as Wittgenstein put it in the *Tractatus*, is allied to the view that they are true by convention. They owe their "necessity" to the fact that their truth is ensured simply by the meaning of the signs which are used to express them.

Wright, for reasons which I find obscure, objects to what he calls the model of modified conventionalism that it cannot account for the necessity of propositions like "nothing can simultaneously be red and green all over", where the key terms are learnt ostensively and not through the presentation of semantic information in sentential form: and he also, like Quine and Dummett before him, queries the status of the consequences of a convention, the dilemma here being that if we say that a statement of the form "C implies q" "is itself merely a convention, the resulting position is tantamount to a version of radical conventionalism: it is just that our adoption of the convention q takes the form 'Let q be a consequence of C'. But if we say that the statement is not a convention, how can we avoid the conclusion that its necessity consists in its description of a non-conventional conceptual connection?"

Wittgenstein accepted the first horn of this dilemma. His conventionalism was radical. It would be pleasant to be able to follow him, but neither he nor Wright, speaking in his defence, has succeeded in accounting for the way in which acceptance of the rules of logic and mathematics limit, or at least seems to limit, our freedom. Although I cannot prove the point, my own view is still that modified conventionalism is the *safe* bet.

Professor Wright's book deals with a wide range of topics and goes very thoroughly into them. If one sometimes wishes that the style were less opaque and the argument easier to follow, one must still give the author credit for not shirking the difficulties of a subtle and intricate set of problems and at least removing some of the lumber that lies in the way of their solution.

A. J. Ayer

Sir Alfred Ayer recently retired as Wykeham Professor of Logic in the University of Oxford. He is a fellow of Wolfson College, Oxford.

A meeting-ground for philosophy and social theory

Central Problems in Social Theory: action, structure and contradiction in social analysis
by Anthony Giddens
Macmillan, £10.00 and £5.95
ISBN 0 333 27293 5 and 27294 3

Tony Giddens leaves the reader with little doubt about how to interpret the contents of his latest book. After the title page there is what is presumably a dedication, in the form of a quotation from Merleau-Ponty, making the quite astounding assertion that "culture" is placed "in a situation of permanent crisis" by the rivalry between philosophy and sociology and their failure to find a common meeting-ground. Throughout the book Dr Giddens reverts again and again to the first person singular: "I shall elaborate a conception", "I want to suggest", "I proposed", and so on. He has, that is, adopted the stylistic mannerism of the professional philosopher rather than that of the sociologist. [illegible] to overcome the rivalry.

What this book means by social "theory" therefore must be understood as different from what professional sociologists usually mean by it, namely an empirically substantiated explanation for the ebb and flow of social interaction as it is experienced in the commonplace or not so commonplace daily life of an identifiable category of people. Rather Dr Giddens has in mind what the philosophers mean by "theory"—those assumptions which underpin a philosophical set of general ideas for the interpretation of every element of some feature of some individual philosopher's experiences. Thus from the beginning the book implies an attempt to end Merleau-Ponty's "permanent crisis", by absorbing social theory into philosophy, by locating sociology within metasociology.

For this reason, although it contains some useful comments for sociologists on certain aspects of the writings of a number of little remembered thinkers, intersections as absent [illegible] acknowledges his debt to Heidegger—the book does not try to provide philosophers with an understanding of sociological techniques of research as applied in the effort to describe and account for the behaviour of various people. Indeed, Ernest Nagel who attempted to do precisely this, is dismissed here without discussion as representing merely a "positivistic" imposition of the "received model" of natural science as appropriate for sociology. What is therefore presented in the place of what Dr Giddens regards as clearly inappropriate is nothing more than this "received model" of speculative philosophy, in order to identify the assumptions which the book assumes every sociologist *ought* to make to interpret every element of social experience.

Thus we are told that the fundamental theme of the book is "that every social theory must acknowledge, as it has not done previously, the writings of a number of little remembered thinkers, intersections as absent [illegible] which he believes sociologists ought to make about these concepts in order to use them appropriately. This is very well done [illegible] although at times he clearly permits what Whitehead called the dogmatic fallacy—"the persuasion that we are capable of producing notions which are adequately defined in respect to the complexity of relationship required for their [illegible] in the real world"—he has succeeded, often elegantly, in expressing the errors of other writers about these sorts of concepts.

Central Problems is conceived as a bridge between *New Rules of Sociological Method* and another book on contemporary capitalism and socialism which he is at present preparing. Its value will therefore not properly be appreciated until that study is published.

J. A. Banks

J. A. Banks is professor of sociology at the University of Leicester.

BOOKS

On necessity and truth

Wittgenstein on the Foundations of Mathematics
by Crispin Wright
Duckworth, £35
ISBN 0 7156 1000 7

Of all the work of Wittgenstein that has been posthumously published, his *Remarks on the Foundations of Mathematics* has had the least favourable reception. The logician Georg Kreisel went so far as to call it "a surprisingly insignificant product of a sparkling mind", and while the piety which Wittgenstein's name still commands has prevented other critics from speaking in quite such derogatory terms, the prevailing view has been that his contribution to the philosophy of mathematics was below the level of the best of his later work.

In an excessively expensive book of inordinate length and daunting complexity, Professor Wright has now attempted to show that this verdict is unjust. He does not go so far as wholly to endorse Wittgenstein's conception of mathematics but he does aspire to show that the *Remarks on the Foundations of Mathematics*, taken in conjunction with Wittgenstein's *Lectures on the Foundations of Mathematics*, delivered at Cambridge in 1939, and also posthumously published, have deep roots in Wittgenstein's overall philosophy of language; and he claims that when these works are seen in this light, they "both testify to a wealth of vigorous, profound and valuable thought on some of the most difficult questions in philosophy".

These questions turn on the concepts of necessity and truth. Professor Wright begins with a discussion of the dispute in the philosophy of mathematics between the upholders of the classical or Platonic theory that propositions are *objectively* endowed with truth-conditions, irrespectively of our power to decide whether they are true or false, and the intuitionists who hold that it is only in cases where we have this power that the ascription of truth or falsehood to a mathematical proposition becomes intelligible. This is, indeed, a dispute that extends beyond the philosophy of mathematics. It is part of the pragmatist tradition, going back for more than a century, that the concept of truth, if it is not to be idle, must be construed in all fields as tantamount to "warranted assertibility". Professor Wright follows the modern fashion, set by his teacher Professor Michael Dummett, of referring to those who take this attitude to truth as "anti-realists".

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A. J. Ayer

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Imaginative interstellar message

Murmurs of Earth: the Voyager Interstellar record
edited by Carl Sagan
Hodder & Stoughton, £7.95
ISBN 0 340 24423 2

At the moment, it seems that the Earth is the only planet in our solar system where life exists. But could there be other solar systems in our universe with Earth-like planets and systems of life similar to our own? With so many stars around us, there certainly must be a high probability that we are not alone in the cosmos. Now with the space age, we have developed messengers that will travel from the Earth to these distant stars. The Pioneer 10 and 11 spacecraft will be the first spaceships to escape from our solar system; to be followed by the Voyager spacecraft which are now between Jupiter and Saturn. If you thought of these spacecraft as interplanetary messengers, what would you wish to say about our special planet, the Earth? This is the problem that was given to Carl Sagan, Frank Drake and some of their colleagues, and in this book they describe their own particular solution to a special message.

The two Voyager spacecraft were launched from Cape Canaveral in August and September 1977 and this marked the beginning of their grand tour of the outer planets; Jupiter, Saturn, Uranus and Neptune; and then on to the stars. The year 1977 also marked the hundredth anniversary of the invention of the photographic record by Thomas Edison. This then solved the first problem of the medium in which any message should be carried on the spacecraft. Attached to the central instrument bay of each spacecraft is a golden disc in a silvery aluminium cover. The instructions for playing the record are etched on the cover in a scientific language, with a cartridge and stylus placed inside the spacecraft. The record is ready to play, so what are the Alpha Centaurians going to hear?

There is no doubt that Carl Sagan and his friends have been very imaginative. The record, which is encoded in an audio spectrum, contains 118 pictures explaining our planet and ourselves. A carefully selected set of pictures cover the important issues of human anatomy, conception, birth and nursing of the young child. Greetings in 54 different human languages will give a friendly welcome to those beings that may capture the spacecraft. Additional contributions include messages from Kurt Waldheim, the Secretary General of the United Nations, and Mr Jimmy Carter, the current President of the United States. Of course, the human life has not been forgotten, as the humpback whales have sent a message too. These terrestrial sounds conclude with a selection ranging from a rocket launch, an elephant's trumpet and then on to a kiss. I wonder what they will make of that.

Of course, no message from the Earth would be complete without the inclusion of some of the greatest music that has ever been composed. This will always be a personal choice, but on this record the choice ranges from the classics, such as Bach, Mozart and Stravinsky, to jazz with Louis Armstrong and tribal music from New Guinea.

This is a very special message—a unique chance to tell somebody who currently resides in the distant stars about life on Earth in 1977. It may not of course ever reach an extraterrestrial civilization. There are those who feel it is very hazardous to reveal our existence and location to the Galaxy. For all we know, any creatures out there may wish to attack and destroy us. However, I feel that this is a chance we must take.

Garry E. Hunt

Garry Hunt is head of the laboratory for planetary atmospheres in the department of physics and astronomy at University College London.

Oxford University Press

The Finite Element Method
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A. J. Davies
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BOOKS

Experimenting with relativity

A Short Course in General Relativity
by J. Foster and J. D. Nightingale
Longman, £5.45
ISBN 0 582 44194 3

Elementary General Relativity
by C. Clarke
Edward Arnold, £5.95
ISBN 0 7131 2763 5

Gravitational Curvature: an introduction to Einstein's theory
by Theodore Frankel
Freeman, £11.70 and £5.20
ISBN 0 7167 1006 4 and 1062 5

Gone are the days when it was popularly believed that only three people in the world really understood general relativity. Although this belief was always an exaggeration, it did reflect a widespread feeling even among physicists that the theory was exceptionally difficult to understand, and that the effort was not worth the return. Physics from 1920 to 1960 had pressing problems to solve in quantum mechanics, nuclear structure, and solid-state theory. What, after all, was general relativity good for?

Nobody asks this today. Undergraduates and postgraduates in mathematical physics and astronomy want to know about black holes, neutron stars, gravitational waves, and the big bang theory. In response to this demand, universities have begun to experiment with courses in general relativity for advanced undergraduates and for postgraduates who will not necessarily specialize in the subject. In this country I know of such courses at Bristol, Cardiff, Oxford, Queen Mary College (London), Southampton, Sussex, and York, and there are undoubtedly many others. These three books are among an increasing number of texts that have grown out of such experiments.

My experience over the past five years at Cardiff has convinced me of one thing: general relativity is not overly difficult for undergraduates to learn, little more difficult in fact than electromagnetic theory. Modern mathematics has provided us with new and simpler ways of presenting the equations, and the past twenty years of intense research into relativity itself have helped find simple and direct approaches to the physical effects predicted by the equations. In some respects a course in general relativity is ideal for a final-year student in mathematical physics, astrophysics, or pure mathematics, because it applies elegant mathematics first to the construction of a physical model (the theory itself) and then to the solution of interesting problems.

But enough of generalities. The three textbooks at hand all make some use of the modern approach to differential geometry, and all cover roughly the same applications: black holes, gravitational waves, and cosmology. All are also short, which makes them reasonably inexpensive and easy to use. Where they differ is in the background they assume of the students and the emphasis they place on applications.

Foster and Nightingale's *A Short Course in General Relativity* is the longest (162 pages plus appendices) and the most physical. Students should know linear algebra, calculus of several variables, special relativity (there is an appendix to help with this), and some basic physics before beginning the course. Electromagnetism would be helpful but not necessary. The book develops tensor calculus adequately (introducing, in fact, rather more than it subsequently uses), and it is reasonably careful in its definitions of tensors, manifolds, and connections.

Unfortunately, the mathematical development seems poorly motivated. For instance, I could find no examples of one-form (covectors) where they are introduced. There is also little motivation of the field equations or indeed of the need to use curved space-time as a model for gravity, and little development of the stress-energy tensor.

I liked the book better for its applications. It has a through discussion of motion near black holes and a brief look at the black hole's horizon itself. Unfortunately, the interior structure of stars is ignored. It covers simple gravitational waves and even has a formula for the energy carried away by the waves, but it falls into a disturbing error in problem 5.4 by suggesting that there is no gravitational radiation from moments higher than quadrupole! The discussion of cosmology is brief but adequate, though it leaves all observational aspects to the problems.

Clarke's *Elementary General Relativity* requires much the same preparation as the previous text. In its tone and development it seems designed for more mathematical students, who are already used to its more abstract notation. I liked the development of the mathematics here better than Foster and Nightingale's, principally because it goes hand in hand with its physical application. Tensor algebra is developed in the chapter on special relativity, the theory of curved manifolds in the chapter which develops the equivalence principle and the field equations. Continua and the stress-energy tensor are treated more systematically as well.

The applications of the theory are a bit shorter than Foster and Nightingale's, but cover much the same ground. Again, it is sad not to see relativistic stars or observational cosmology discussed. Dr Clarke has a strong reputation for his research in general relativity, and his book reflects this. The writing is precise and accurate; the student should be in no doubt that the author is in command of his subject. Sadly, however, I could find no references in the book to other texts or textbook papers. Lecturers who use the book would do well to supply their own.

Frankel's *Gravitational Curvature* is a very different book from the previous two. It is aptly named: it concentrates on the geometry of space-time rather than on physics. It is aimed at students with a good background in pure mathematics, including a thorough course in differential geometry (Warner's *Foundation of Differentiable Manifolds and Lie Groups*, Scott-Foresman, 1971, is the best main reference for this). The treatment of general relativity is therefore more sophisticated than in the other two books.

This work is unique among the textbooks I know in its consistent emphasis on the geometrical interpretation of every result. Einstein's equations are derived in terms of Gaussian coordinates; the Schwarzschild solution is derived from its embedding; continuum mechanics is treated very thoroughly using Lie derivatives, and even the structure of a relativistic star is approached from the point of view of its curvature. The book could therefore make interesting reading even for research workers in the field.

The stress on geometry does not prevent the book from reaching real physics, however. For students who can follow the treatment, there are good discussions indeed of electromagnetism, continuum physics, light propagation and cosmology. The book is weaker than the previous two, however, in its discussion of black holes and the crucial tests of general relativity.

One noticeable thing about all three books is the small space given to tests of general relativity. Even 10 years ago, a textbook would have had to mention competing theories with some respect and would have spent much time convincing the student that general relativity was correct. Today there is a near consensus among scientists that the theory is well tested and, even more important, has no viable competitors. So modern textbooks at an introductory level quite rightly place their stress on the theory rather than its justification.

It goes without saying that a text can replace a teacher, and that a teacher must know his subject more deeply than the text he is using. This is particularly true of these books. Useful as they are, they will all need considerable supplementation from the lecturer, who will also have to supply extra references, background material, and above all motivation. Used in this way, any of them could help new universities open up the mysteries of general relativity to their undergraduates.

Bernard F. Schutz

Bernard F. Schutz is reader in general relativity at University College, Cardiff.

Cure for cultural anorexia

Knowledge and Wonder: the natural world as man knows it
by Victor F. Weisskopf
MIT Press, £3.70
ISBN 0 262 23098 4

There are few writers able to attempt within 300 pages an account of the natural world ranging from atomic nuclei and quarks to reproduction mechanisms in man, and from the nuclear "year" of 10^{-23} seconds to the age of the universe. Weisskopf must be one of the very few who have succeeded by being so consistently stimulating, yet without a surfeit of excitement or excessive richness of fare. The "know-how" of the title is always evident and clearly arranged for ready assimilation. The "wonder" is left to the reader and rarely openly invited. Therein must lie a major part of the success of the book and this updated version will doubtless prove to be equally popular. It is a comment on the continued high rate of progress in science that the first edition of 1962 should need so much additional material in the chapter on life, as well as in relation to nuclear particles. The chapter on chemistry has also been largely rewritten.

In contrast with many recent glossy productions, some of outstanding merit, this volume relies on a telling text, a very few black and white photographs and a fair number of sketch diagrams that seem to play down rather than exploit the animation of the processes depicted. Thereby it may be selective of its readers but at the same time it may inform or refresh the very readers that other books do not reach. There is a danger of specific cultural anorexia in sections of the populace, a lack of appetite for science and especially for the implicit reductionism stimulated by the over-confident "nothing-but-ery" of physics and chemistry in its approach to biology. So easily this text could have taken this path but; after its lucid progression from the nature of electricity, light, atoms, nuclei and sub-nuclear particles through the workings of quantum mechanics to chemical molecules, biological molecules and eventually DNA, it uses more cautious words of introduction: "As always in science, answers can be only partial."

Wonder is half of the title but is scarcely aimed in the text. There is no inviting "Isn't it wonderful" about the presentation, and only an occasional "Here we must pause and think". A conscious pause and think "How does the cell know?" leads only to a probable explanation along centrifugal lines. The reader will use whatever depths of enjoyment he can provide to make this text part of his own experience and understanding, and so pass through knowledge into wonder, wonder at the known and of what we know is so far unknown.

E. J. Burge

E. J. Burge is professor of biology at Chelsea College, London.

BOOKS

Reminiscences of nuclear physics

What Little I Remember
by O. R. Frisch
Cambridge University Press, £9.50
ISBN 0 521 22297 4

Three themes recur in this short book of reminiscences by Otto Frisch; his physics, his music, and the people he worked with or came across, including not a few geniuses of the calibre of Bohr, Fermi and Einstein, together with a number of notable eccentrics. They emerge vividly through countless anecdotes, many of which I had heard him tell before during 20 years' friendship, but which seem here as fresh as ever. The style of the book is characteristic of the author—lucid, straightforward and essentially uncomplicated.

A fascinating revelation appears early on: through a philosopher uncle the boy Frisch met a gifted mathematician who introduced him to four-dimensional geometry: ". . . I worked out the properties of all the regular polyhedra in four dimensions. The most complicated one, consisting of 120 pentagondecahedra, took several days of preparation and then two hours of unremitting concentration which gave me the first headache of my life . . . those months of fascination with four-dimensional geometry were excellent training which later helped me, and still does, in designing complex scientific devices." A rich field of investigation here for educational psychologists, I would think.

Frisch disclaims any great originality: yet the idea of nuclear fission (which name he invented) was to resolve a baffling puzzle in nuclear physics and lead the way to the atomic bomb and to atomic power. In true inspirational fashion reminiscent of Kekulé and his benzene rings, the idea came to him and his aunt Lise Meitner while they were walking in a Swedish forest in 1938. He recounts how they sat down on a tree trunk and did the essential calculations out of their heads on scraps of paper. Frisch rushed back to Copenhagen to check the idea with Bohr, did the decisive test experiment in two days, and then composed the paper for *Nature* with his aunt over the telephone. The contrast with today's "big science" experiments lasting several years with teams of dozens of scientists could hardly be more striking.

Like many of his contemporaries Frisch's career was cut short by the war, and he found himself working at Los Alamos on the momentous practical realization of his own discovery. He explains how he at first had no misgivings: what nature had revealed to allied scientists it could also have revealed to Hitler's; so there was no choice—the atomic bomb had to be built. However, together with many of those working at Los Alamos, he was deeply disturbed by the political decision actually to use it. Would not a demonstration staged on an uninhabited island with the Japanese invited to watch the explosion have sufficed to end the war? I never once heard Frisch comment on contemporary politics; I am convinced that this painful involvement confirmed him in his instinctive distaste for all things political.

The story tails off towards the end—about his Cambridge days. He did not want to risk offending his contemporaries, and in any case he realized that much has been told and will be told about this era. In fact he had by then done his best physics: apart from his valuable popularizing of science and lecturing he came to concentrate on doing what he liked best—designing scientific devices.

At his seventieth birthday dinner in Cambridge he made a speech largely consisting of a selection of these reminiscences. Some of his friends and family urged him to write them down, and this book is the result. It was not intended as a work of history, but it can give us insights and some considerable pleasure.

J. G. Rushbrooke

J. G. Rushbrooke is with the Organisation Européenne pour la Recherche Nucléare, Genève, on leave from the Cavendish Laboratory, University of Cambridge.

New statistical inferences

Some Basic Theory for Statistical Inference
by E. J. G. Pitman
Chapman and Hall, £6.00
ISBN 0 470 26554 X

Over the years a widening gulf has evolved between mathematical probability theory and statistical inference: although elegance and generality have often been characteristic features of the former, they have largely been conspicuous by their absence in the latter. This partly reflects the very unsettled nature of the philosophical foundations of inductive inference, where such attention has been focused on the solution of particular problems rather than on the canvas as a whole.

The task of trying to formulate the main results of inference in a mathematically more appealing way (while at the same time retaining their statistical import) is a daunting one. The efforts of Professor Pitman to achieve that goal in this book therefore deserve widespread applause. The author explains accurately that his book has as its theme "a new look at some old statistical theory", and it embraces such topics as the Cramer-Rao inequality, maximum likelihood estimation, asymptotic power of a test, and a study of the sample distribution function.

Professor Pitman is concerned with placing these topics on a firm mathematical footing and begins by developing the idea of distance between two probability distributions from the same parametric family. This leads him to define two parameter-dependent quantities for a statistic: its sensitivity rating (which depends on its density function) and its efficiency rating (which depends on its mean and variance). The relationships between them and the closely related concept of information are examined in a detailed and illuminating way. A short chapter extends the ideas to the case of several parameters, though this aspect is not subsequently pursued.

Although containing a useful appendix summarizing some of the more special mathematics on which the author draws, the book is levelled at a statistically as well as mathematically mature readership; the specialist will find much to savour and should be highly appreciative of the conciseness and intrinsic appeal of the approach Pitman has adopted.

H. W. Peers

H. W. Peers is lecturer in the department of statistics at the University of Leeds.

Hot potato

An Invitation to Mathematics
by Norman Gowar
Oxford University Press, £9.50 and £3.95
ISBN 0 19 853002 1 and 853001 3

Fear of mathematics, like spiders, is not based on rational assessment. Secondary school algebra, geometry and arithmetic are conceptually no harder than chess or crossword puzzles, and immeasurably more useful. Yet neurotic dread isolates most of the population from a system of thought that continues to penetrate all areas of human activity: from the world of science and technology to that of medicine, business and social studies, mathematics matters.

Few books are written specifically to smash the mental blockage of those who switched themselves off from mathematics at school but have a sneaking suspicion that they are missing out. This book is for them.

The task facing the author is formidable, because most of the intended readership will drop the book fast when browsing through its pages. The reason is that mathematical symbols, like the sight of eight legs, instantly rekindles the old prejudices and barriers. Yet how can one even talk about mathematics without the occasional x?

Norman Gowar's attempt is brave, witty, well intentioned and straightforward. The treatment is based on the reader's assumed familiarity with the one branch of mathematics most people never managed to shut out—arithmetic. Starting with ordinary numbers, the reader is led gently through shapes, sets, functions, complex numbers and eventually elementary calculus. Some manipulative rules are given on the way. The text is punctuated by odd comments on historical episodes or the wider implications of a piece of reasoning.

This sort of book is not so much intended to teach the reader mathematics as to develop a mathematical perspective—to introduce the mathematical way of tackling problems and organizing concepts. It would certainly supplement more formal textbooks for O and A level students, but can be read with profit by all those people who are disturbed by the fact that their knowledge of one of the greatest enterprises of the human race is comparable with a faltering competence at reproducing the alphabet.

Paul Davies

Paul Davies is lecturer in mathematics at King's College, London.

Peano
Life and Works of Giuseppe Peano
Edited by
HUBERT KENNEDY
1980, xii + 230 pp.
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BOOKS

Correspondence with Frege

Philosophical and Mathematical Correspondence
by Gottlob Frege, edited by B. McGuiness
Blackwell, £15
ISBN 0 631 19620 X

The original longer German editinn was called *Wissenschaftlicher Briefwechsel* and this conveys the contents more closely. For, of course, there never were two sets of letters, one mathematical, one philosophical; it is impossible to separate these two activities in Frege's work. His letters suffered many adventures, like his posthumous writings, and we are lucky to have as many as we have. The correspondence with Lowenheim is lost, which is perhaps the largest single loss; but also one may express scepticism at *Wittgenstein's* refusal (in 1936) to part with Frege's letters to him because of their "purely personal; not scientific content".

McGuiness has selected carefully from the rather small part of the letters remaining, with the intention of excluding routine notes but nothing which might be of genuine *interest. One can judge that nothing* is lost by this policy by considering the letters which have nevertheless been included—those to or from Bollue, Couturat, Hönigswald, Huntington, Liebmann, Pasch, Stumpf, Vailati and Zsigismondy. These tell us very little, though it is a great pity that the Pasch correspondence seems not to have got very far.

In 1899 Pasch is thanking Frege for a paper on Schubert's numbers and laments with Frege the lack of care in mathematical foundation; but such research means "one will again and again be forced to think about the deeper questions and must take time off from the proper subject matter. But what will then become of the activity of teaching? The books that advance without a single doubt prove most successful with students—much error and a tiny spark of truth".

On the other hand there is a fair amount of interest in his correspondence with Dingler, Hüssell, Korselt, Lluke, Marty, Pesand, and a very great deal in those with Hilbert, Jourdain and, of course, Russell. The general tenor of the Hilbert correspondence is well-known but here it is possible to see in detail the careful staking out of positions and subsequent alienation of two opponents of quite unusual obstinacy. The point at issue is the nature of an axiom. Hilbert seems to take up two mutually inconsistent positions; for him, "If the arbitrarily given axioms do not contradict one another with all their consequences, then they are true and the things defined by the axioms exist".

But Frege detects in Hilbert some remains of the "old meaning of the word 'axiom', which comes out in the proposition that the axioms express fundamental facts of intuition". Frege's own position is subtly different: "I call axioms propositions that are true but are not proved because our knowledge of them flows from a source very different from the logical source, a source which might be called . . . intuition." But it is not really this difference that gets under Hilbert's skin but rather Frege's astonishingly early perception of the acute need for, and in a general way the unlikelihood of, a consistency proof for a Hilbertian system.

Both the Jourdain and the Russell letters deal mostly with the relationship between the *Begriffschrift* and the *Grundgesetze* and *Principia Mathematica*. There is a surprising passage in Jourdain's letter in 1913: "In your last letter to me you spoke about working at the theory of irrational numbers. Do you mean that you are writing a third volume of the *Grundgesetze der Arithmetik?* Wittgenstein and I were rather disturbed to think that you might be doing so, because the theory of irrational numbers—unless you have got a new theory of them—would seem to require that the contradiction has been previously avoided . . ."

However, the answers from Frege take up other points in the same letter about sense and reference, so this is lost sight of. More background to the Frege-Cambridge connexion is provided by a 28-page appendix consisting of Jourdain's account of Frege in his 1912 *Quarterly Journal* paper.

Although there is not enough new material to provide a strikingly new insight on anything, it is a great convenience to have the Frege letters collected together and translated. The editing is efficient and unobtrusive.

C. W. Kilmister

C. W. Kilmister is professor of mathematics at King's College, London.

Most ingenious paradox

Surprises in Theoretical Physics
by Rudolf Peierls
Princeton University Press, £9.10 and £2.30
ISBN 0 8239 1 and 0 8240 5

That problems in theoretical physics sometimes have solutions which are, at first sight, paradoxical and repugnant to common sense, is notorious. The "twin paradox" of the theory of relativity is certainly the best known example, which after *the Einstein centenary year and the* efforts of the BBC must by now be familiar to the proverbial man on the Clapham omnibus. Many other "surprises" have occurred in the development of theoretical physics. Some involve problems of interpretation, some are cases in which what seems to be a soundly based approximation turns out on closer analysis to be incorrect, and, more rarely, some are cases in which an approximation, generally held to be poor, turns out to be accurate after all.

In his long and distinguished career, Sir Rudolf Peierls, the doyen of theoretical physics in the United Kingdom, has encountered many such surprises, for which the subsequent analysis and explanation has led to a deeper understanding of physical processes. In this book, based on lectures given at the universities of Paris-Sud and Washington, he has given us a fascinating account of a selection of these problems.

The problems chosen by Sir Rudolf are drawn from many branches of physics, including general quantum theory, statistical mechanics, the theory of solids, nuclear physics and the theory of relativity. For the most part, the problems are among those for which the solution was obtained by the author and his collaborators. One of the most interesting sections contains a penetrating analysis of the origin of irreversibility in statistical mechanics—a source of difficulty to many physicists and erroneously treated in many textbooks.

This problem arises because statistical mechanics is concerned with systems composed of many particles, the motion of which is governed by Newton's equations. These equations are time reversible in the sense that if the time t is replaced by $-t$ in a solution, the *result is also a solution. However,* such systems as a whole is not time reversible, as the second law of thermodynamics requires that the entropy of an isolated system can never decrease. How can this come about? The explanation lies in limitations on the kind of experiments that can be performed. These are necessarily "one-sided", in that systems are observed evolving from some initial set of conditions, and experiments cannot be specified in terms of future conditions. These considerations depend on the directionality of time, the "arrow of time", which certainly exists in our minds and for which a physical explanation is lacking. Possible explanations in terms of the expansion of the universe are examined *by the author* and found unconvincing.

Many famous physicists including Einstein, and at times, Schrödinger, and de Broglie, have found the probabilistic nature of the quantum mechanics (the "Copenhagen interpretation"), unacceptable, and have sought an alternative interpretation. One line of attack is to introduce "hidden variables". These quantities are unknown to us, but they are supposed to determine the result of an experiment, rather than just the probability of a certain result. It was proved by von Neumann that hidden variables cannot be introduced without giving up some of the well-tested results of quantum mechanics. The surprise in this case is that the proof contains an assumption which seems to have no physical justification, and that this was not noticed for many years, until the work of J. S. Bell in the 1960s. Once again, Sir Rudolf gives us a lucid account of the controversy and of Bell's proof of von Neumann's theorem based on the reasonable assumption that particles which are far from each other have no influence on each other.

Many of Sir Rudolf's surprises relate, not so much to the grand scheme of things, as to the day-to-day work of theoreticians attempting to calculate results from established fundamentals. Sometimes first-order perturbation theory provides a small number as an estimate of a certain quantity, or the exact value of that quantity may be known to be small. Under these circumstances, a common trap for the unwary is to assume that the results of the first-order theory are accurate. This may indeed be so but in many cases this is false.

A striking example is the difference scattering of electrons by atoms at high energies and at large angles of scattering. The scattering predicted by first-order perturbation theory is orders of magnitude smaller than the correct result, which is, in fact, given accurately by second-order perturbation theory. Several such cases are considered in the book, including some results from partial scattering and the scattering of gamma rays by atoms.

Although many of the questions discussed are profound and drawn from several specialist areas, sufficient background is given to make the material comprehensible to someone with a first degree in physics and an inquiring mind. The theoretical physicist will find certain insights into the thinking of some of the great practitioners of his art. One cannot but admire the clarity of the arguments put forward in simple, but exact, language not obscured by an over-elaborate mathematical apparatus.

B. H. Bransden

B. H. Bransden is professor of physics at the University of Durham.

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MATHEMATICAL PHYSICS
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Statistical methods

Mathematical Models in the Social, Management and Life Sciences
by D. N. Burghes and A. D. Wood
Ellis Horwood Wiley, £13.50
ISBN 0 85312 097 8

Statistics
by D. Freedman, R. Pisani and R. Purves
Norton, £7.95 —
ISBN 0 393 09076 0

Burghes and Wood state in their preface that their book is written for students in such disciplines as economics "who need a practical course in applying mathematics, and for mathematics students and teachers who want to see the importance of mathematical concepts in a variety of realistic situations". The topics covered include different equations and first and second order differential equations (with applications to economics, population growth, carbon dating and stock control), matrices (with applications to input-output models, systems of linear equations and discrete population growth), optimization problems using calculus and mathematical programming (with applications to problems in operations research), game theory and catastrophe theory.

Each chapter starts with what the authors call a "case study". This is used to motivate the subsequent discussion of the appropriate mathematical techniques which are then applied to the original example and to other applications. Inevitably for a book of this size and range, the "case-studies" are all artificial and there is absolutely no discussion of the problems of translating a real problem into mathematical terms. The inclusion of chapters on finite games and catastrophe theory is somewhat surprising in what is supposedly a basic introductory book when one considers the relative usefulness of these areas.

In general, the standard of rigour and difficulty in the book is not what would normally be expected of mathematics students, whereas the discussion of the mathematical methods used is too concise for students who have not previously seen them. As a result, the book does not really stand on its own, but no doubt it will provide a valuable source of motivating examples for other texts.

Statistics by Freedman, Pisani, and Purves is an introductory text for students averse to mathematics. The book contains very few formulae or even symbols; indeed, the whole approach is original. In the preface, the authors point out that many mistakes are made by blindly substituting numbers into statistical formulae. Their aim, therefore, is to teach students to think in the appropriate manner for the problem in hand.

The opening two chapters explain the difference between controlled and observational studies and include some examples of the mistakes that have been made in drawing inferences from observational studies. There follow accounts of descriptive statistics, correlation and regression, probability, sampling, confidence intervals and hypothesis tests. There are interesting chapters on opinion polls and the US current population survey. The chapter on genetics contains a discussion of the evidence that Mendel's data was altered; indeed, throughout the whole book the authors discuss many actual problems where statistical methods have been helpful.

The authors approach is to first try to develop a feeling for data and to use this to motivate subsequent definitions and theory. Strong emphasis is placed on the fact that any inference is dependent on assuming an underlying probability model. The book contains very few problems which involve much calculation, and even the usual more efficient way of calculating the *variance is mentioned* only as a "technical note". This is, however, quite consistent with the authors stated aims. Because of its unorthodox approach and subject order, it is unlikely that the book could be adopted as a course text unless it was followed fairly closely. However, it is very well written and has a lot to offer.

R. J. Reed

R. J. Reed is lecturer in statistics at the University of Warwick.

ROYAL HISTORICAL SOCIETY ALEXANDER PRIZE

Applications are invited for the Annual Alexander Prize awarded by the Royal Historical Society for the best essay from a British or Irish author on a historical subject. Candidates must be under the age of 30 on the closing date for the receipt of essays. Each essay should not exceed 6,000 words in length, be typed in duplicate, and be accompanied by a certificate from the author will be awarded a silver medal. The essay is required to be in the form of a paper suitable for publication in the Society's Transactions. Essays should be sent to the Secretary, Royal Historical Society, University College London, Gower Street, London WC1E 6BT.

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Throughout the book there are plenty of clear definitions and at all times the author tries to give lucid explanations relating to the work discussed. Worked examples and exercises are plentiful. It is a welcome addition to the statistical literature available at this level. *Mathematical Spectrum.*
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Publication June

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41 Bedford Square, London WC1B 3DQ

NOTICE BOARD

Noticeboard is compiled by Patricia Santinelli and Mila Goldie

Chairs

Bernard L. Myers, from the Royal College of Art, has accepted appointment as Brunel's first professor and head of department of design and technology. His main task will be to develop the undergraduate course for practicing teachers of design and technology which the university will offer from next September following the merger with Shoreditch College of Education at Isleworth.

Appointments

General

E. M. Bailey, head of the German department at Goldsmiths' College, University of London and former editor of Modern Languages, was recently elected President of the *Federation Internationale des Professeurs de Langues Vivantes* for a three-year period commencing January 1, 1980.

Roger Lewis joined the National Extension College on April 10, 1980, as an assistant director (education). Roger Lewis has had an impressive career in teaching in both primary and secondary schools and in adult education with the Open University, Leeds Polytechnic, colleges of education and WEA. He is also an author of course texts for the NEC and the OU.

Forthcoming events

The Energy Centre at the University of Newcastle is holding a special series of lunchtime lectures covering Fast Reactors (May 12), Oil and Gas from Coal (May 19), The Case for Nuclear Power (June 2) and *Assessing the Risks of Energy* (June 9) in the lecture theatre, School of Physics. Admission free.

* * *

Mr David Evans, a fellow of the Royal College of Surgeons and president of the British Orthopaedic Association, will open an international conference on Engineering Aspects of the Spine, being held on May 7-9 at the Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster. Themes covered in the conference will include lifting, mechanics, trauma, anatomy and scoliosis and will be based on experience gained in research projects carried out in America, Canada, Sweden and European countries. Further details from Mr G. V. Williams, press and information officer, Institution of Mechanical Engineers.

Mr Gregg Bamber, of Durham University Business School, is speaking on Trade Unions for Managers at the university Industrial Relations Group open seminar being held on May 6 at 4pm at the Adult Education Centre, 32 Old Elvet, Durham. Further details from Dave Bright (0385-64465).

Dr Peter Elliott UMIST lecturer points to an example of corrosion which affects us all. Visitors to the university's open day in May 17 will be able to learn how to avoid their cars disintegrating as well as how to test the strength of their home brew. Admission is free.

Recent publications

A Guide to Language Courses in Polytechnics and Similar Institutions 1980-81, a booklet produced by the Standing Conference of Heads of Modern Languages in Polytechnics and other colleges, is designed to guide students through the complex range of courses in languages and help them find the courses of their choice in higher education. (Available from the Centre for Information on Language Teaching and Research, 20 Carlton House Terrace, London SW1, £2.00.)

* * *

Britain in Decline—a select Bibliography is the first title in Headland Press new current affairs bibliography series. It presents an annotated selection of what Mr Gerry Smith, the compiler, views as the most important literature on this theme. (Available from Headland Press, PO Box 9, Hartlepool, Cleveland TS25 5ST. £8.95.)

* * *

Teacher Education for Primary School Teachers, produced by the University of Leeds School of Educational Colleges Curriculum Project, gives an account and evaluates two courses of teacher education at Brotton Hall College and the North Riding College. It is intended both as a means of comparison and for planning similar courses. (Available from the secretary, School of Education, Leeds University, Leeds LS2 9JT, £1.85.)

Open University programmes May 3 to May 9

Saturday May 3

BBC 1
9.15 Renaissance and reformation: Renaissance Spectacle (A201: prog 6).
9.40 Mass communication and society: TV News at the Conferences (D263: prog 6).
10.05 Modern art from 1848 to the present: styles and social implications: Rodin (A301: prog 4).
10.40 History of mathematics: The Algebraic Equations (A289: prog 4).
11.05 British century poetry: "Marina" by T. S. Eliot (A306: prog 8).
11.30 Arts foundation course: Music and drama (A101: prog 12).
12.55 Counting psychology: A Normal Child? (D305: prog 7).
2.20 Working and society: Closing in Closer? Part 2 (D205: prog 5).
2.45 The handicapped person in the community: Goal Planning in the Community (P251: prog 6).
4.10 The early Middle Ages and the rise of Christianity: Interior Decoration (A204: prog 3).
4.35 Conservation policies, Welfare and Science: Revolution (D203: prog 6).
5.00 Faith science topics and methods Part: Microbials and Their Uses (P251: prog 5).
5.25 Biochemistry and molecular biology: The Properties of Enzymes (programme 10) (S203: prog 6).
5.50 Creativity and learning: It all depends on Your Point of View (P201: prog 6).
6.15 Fundamentals of human geography: Economic Ecosystems: Tropical Forests: Case Study (D204: prog 6).
6.40 History of architecture and design (1750-1900): Berlin Stadtmugen (A300: prog 9).
7.05 Children in the family: I Just Didn't Believe it Would Turn Up for Them (P200: prog 9).
7.30 Fundamentals of statistical inference: Functions of Random Variables (E341: prog 3).
8.00 Mathematics foundation course: The Berlin Problem (M342: prog 6).
8.25 Technology foundation course: Dutch Elm Disease (T101: prog 7).
8.50 Arts broadcasts for students in the Scottish and Radio Cymru areas only: Tao's religious mural: Buddhism in Taiwan (A202: prog 2).
9.15 Sociological perspective: Observations, Similarities and Roles (D301: prog 6).

BBC 2 (VHF)
6.30 Education and the urban environment: The School in Work Bridge (E351: prog 3).
7.00 Analysis: Systems and Infima of Sets and Differentiation of a Product (U203: prog 3).
7.45 Computing and computers: Checking Statistics for Inconsistency (E351) and Arts foundation course: Music and Mathematics: Mathematics foundation course: Mathematics Maths 8 (M101: prog 6).

BBC 4 (VHF)
Special and mid-Welsh transmitters
Music For 4 — 19

9.30 Fundamentals of statistical inference: Vector Random Variables (M341: prog 3).
9.50 Food production systems: Wildlife as Food (P219: prog 3).
10.10 Environmental control and public health: Water Conservation (P172: prog 3).
10.35 Cell, Algae and Water Quality (P701: prog 3).
11.30 Curriculum design and development: Myers Group: A Comprehensive Ideal (E203: prog 4).
12.05 Decision making in Britain: Farm Specialisation and Marketing Costs (D305: prog 11).
14.00 Music Fun.
14.25 International politics and foreign policy: (D352: prog 7).
14.40 Social psychology: Piaget in Practice (D301: prog 7).
15.00 Art and environment: Oral Culture (TA202: prog 7).
15.20 Methods of educational enquiry: an empirical approach: Research Sociology (E341: prog 6).
15.40 Biochemistry and molecular biology: Allostery (S202: prog 6).
16.00 The development of instruments and their music from Baroque to Classical: Bach (A341: prog 6).
16.20 Technology foundation course: Rehabilitation (T201: prog 2).
16.40 Open forum — 13
17.00 Mass communication and society: Bias (D263: prog 7).
17.20 Arts foundation course: Classical Painting (A202: prog 6).
17.40 Mathematics foundation course: The Berlin Problem (M342: prog 6).
18.05 Alternative Broadcasts for Students in the Radio Scotland and Radio Cymru areas only: Contract and stability in the development of modern Britain: Question (A300: prog 8).
23.50 Modern art from 1848 to the present: styles and social implications: Rodin (A301: prog 4).

RADIO 3 (VHF)
Alternative Broadcasts for Students in Scotland and Wales only
24.00 International politics and foreign policy: Ideology and Foreign Policy (D352: prog 7).
00.20 Mass communication: Oral Culture (TA202: prog 7).
00.40 Open forum — 13

Sunday May 4

BBC 1
7.40 Computer analysis: Power Series (U352: prog 4).

BBC 2
6.30 (from 5.30 am to 8.45 am Viewers in Wales will be able to see programmes on BBC 1)
7.00 Making sense of society: Banking (D263: prog 8).
8.05 Science foundation course: Space to Stay: Tips to Insert (S101: prog 2).
8.30 Summer School (S810: prog 2).
8.55 Mathematics foundation course: The Derived Function (M101: prog 11).
9.20 Technology foundation course: Dutch Elm (T101: prog 7).
9.45 Mathematics foundation course: The Third Dimension (M101: prog 11).
10.10 Computer analysis: Power Series (U352: prog 4).
10.35 Analogue electronics: Frequency Analysis (T203: prog 3).
11.00 Fundamentals of the chemistry of carbon compounds: Carboxylic Acids and the Derivatives (C324: 1 hour 30).
11.30 An introduction to calculus: Area for Revolution (M201: prog 7).
12.55 Mathematics (M216 Prog 7).
13.25 Nottingham University Mathematics Lecture: Pure and social: Social Work Under Attack (D305: prog 7).
13.50 Telecommunication systems: Data Transmission Part 1 (U361: prog 4).
14.15 Modelling by mathematics: Crashing-with-Safety (T362: prog 10).
14.40 Electronics: Amplifiers: Amplifier Stages (T203: prog 4).
15.05 Mathematics: Area and Volume (M201: prog 7).
15.30 Analogue electronics: Solid Velocity Diagrams (T203: prog 3).

RADIO 3 (VHF)
6.00 Education: data and the social sciences: The Sociology of Elections (D301: prog 4).
6.30 The handicapped person in the community: Goal Planning in the Community (P251: prog 4).
7.00 Arts foundation course: Learning: Piaget and After (A201: prog 10).
7.30 Fundamentals of statistical inference: Sums of Variability (E101: prog 3).
8.00 The nature of chemistry: Tomorrow's Metal (the Society's Transactions (S203: prog 5).
8.30 Elements of music: Non-Imperial Rome (A341: prog 4).

RADIO 4 (VHF) (except for Radio Cymru and Radio Scotland 7.15-7.55)
7.15 The control of epidemics in Britain: Epidemics and Population (S203: prog 3).
7.55 Music in Twelfth Night (A307: prog 4).
8.45 Technology foundation course: Dutch Elm (T101: prog 7).
9.15 Sociological perspective: Observations, Similarities and Roles (D301: prog 6).
9.45 Mass communication and society: Bias (D263: prog 7).
10.15 Open forum — 13
10.45 Computer analysis: Power Series (U352: prog 4).
11.15 Analogue electronics: Frequency Analysis (T203: prog 3).
11.45 Fundamentals of the chemistry of carbon compounds: Carboxylic Acids and the Derivatives (C324: 1 hour 30).
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14.05 Modelling by mathematics: Crashing-with-Safety (T362: prog 10).
14.30 Electronics: Amplifiers: Amplifier Stages (T203: prog 4).
14.55 Mathematics: Area and Volume (M201: prog 7).
15.20 Analogue electronics: Solid Velocity Diagrams (T203: prog 3).

Monday May 5

BBC 1
6.40 Business economics: the Jungle of Investment (B352: prog 3).
7.05 Arts foundation course: Moral Reasoning (D100: prog 7).
7.30 Decision making in Britain: Innovation and Farmer Decision Making (D305: prog 8).

BBC 2
6.05 Systems behaviour: Industrial Social Systems (T241: prog 8).
7.05 Computing theory and atomic structure: Schrodinger Wave Equation (M101: prog 12).
7.30 Linear mathematics: Dual Spaces (U203: prog 13).

RADIO 3 (VHF)
6.00 Technology and society: Pupil Experience (T232: prog 1).
6.20 The revolutions of 1848: the Tragedy and the Farce (A300: prog 10).
6.40 Thought and reality: central theme in Wittgenstein: Philosophy of Psychology and the Vienna Circle (A402: prog 6).

RADIO 4 (VHF)
23.40 Arts foundation course: The Shape of Philosophy (A101: prog 15).
24.00 The early Middle Ages: Empire the rise of Christianity: Martial (A201: prog 6).

RADIO 4 (VHF)
Alternative broadcasts for students in Scotland and Wales only
24.00 Fundamentals of statistical inference: Random Variables (M341: prog 3).
00.20 Control and public health: Water Conservation (P172: prog 3).
00.40 Cell, Algae and Water Quality (P701: prog 3).

Tuesday May 6

BBC 1
6.40 Understanding space and time: Making Time (S356: prog 5).
7.05 Technology and society: Building Structures: Cladding Slates and the Tyrolean Gable (A02: prog 6).
7.30 An algorithmic approach to computer programming: Procedures 2 (U101: prog 4).

BBC 2
6.40 Man's religious quest: Islam in Britain (A300: prog 9).
7.05 Technology and society: Technology and the Day to Day Reality (T232: prog 4).
7.30 Linear mathematics: The Vectorial Stedding (U07 (A203): prog 10).
16.50 Introduction to pure mathematics: Dealing in Equations (M100: prog 7).
17.15 Computing and computers: Computers on Algebra (T101: prog 7).
17.40 An introduction to calculus: X—1/X Area and Revolution (M201: prog 7).
18.05 Arts foundation course: Sharing a Culture (A101: prog 16).
18.30 Science foundation course: Elements Discovered (S101: prog 13).

RADIO 4 (VHF)
6.00 Conversation design and development: Myers Group (E203: prog 5).
6.20 Arts foundation course: Learning (A101: prog 3).
14.40 Technology of cells and organisms: Plastic Surgery (T241: prog 14).
18.20 Technology and society: Children's Discussions Structure (A201: prog 4).
18.40 Understanding space and time: Making Time (S356: prog 5).

RADIO 4 (VHF)
23.20 Renaissance and Reformation: Sonnets of Dante: Some Problems of Interpretation (A201: prog 12).
23.50 The Enlightenment (A301: Enlightened Despotism (A301: prog 10).

RADIO 3 (VHF)
Alternative broadcasts for students in Scotland and Wales only
24.00 Analysis: Systems and Infima of Sets (U203: prog 3).
00.20 Mass communication and society: Bias (D263: prog 7).
00.40 Open forum — 13

Wednesday May 7

BBC 1
6.40 Schooling and society: Cloister to Closer? Part 2 (D205: prog 5).
7.05 The history of instruments and their music: The Alpenhorn Sound (A304: Prog 7).
7.30 Complex analysis: Power Series (U352: prog 4).

BBC 2
6.40 Systems organization: the management of complexity: The Computer: Computer and the Union (T243: prog 4).
7.05 Biological Control (S323: prog 4).
7.30 Comparative physiology: Respiratory Mechanisms (S203: prog 8).
16.50 Elements: How to Build a Phase Detector (S203: prog 8).
17.15 The nature of chemistry: Transition Elements: Oxidation States (S341: prog 13).
17.40 Art in Italy 1490-1580: Michelangelo: The Last Judgment (A332: prog 4).
18.05 Biology: Ecosystems & Volcanoes & Volcanic Rocks (S323: prog 5).
18.30 Mass communication and society: Any Old Conference (D263: prog 10).

RADIO 3 (VHF)
6.00 Technology and society: Technology and Profitability (T232: prog 5).
6.20 Elements of music: Non-Imperial Rome (A341: prog 4).
7.00 Music in Twelfth Night (A307: prog 4).
7.45 Thought and reality: central theme in Wittgenstein: Philosophy of Psychology and the Vienna Circle (A402: prog 6).

RADIO 4 (VHF)
23.40 Arts foundation course: The Shape of Philosophy (A101: prog 15).
24.00 The early Middle Ages: Empire the rise of Christianity: Martial (A201: prog 6).

RADIO 4 (VHF)
Alternative broadcasts for students in Scotland and Wales only
24.00 Fundamentals of statistical inference: Random Variables (M341: prog 3).
00.20 Control and public health: Water Conservation (P172: prog 3).
00.40 Cell, Algae and Water Quality (P701: prog 3).

Thursday May 8

BBC 1
6.40 Personality and persons: II, all Persons Are Persons (P100: prog 8).
7.05 Technology and society: The Chateau and the Cottage (A204: prog 7).

BBC 2
6.40 Introduction to pure mathematics: Dealing in Symmetric Matrices (M100: prog 8).
7.05 The nature of chemistry: Computer Bonds: Transitions (T243: prog 4).
7.30 Oceanography: Currents (S354: prog 4).
16.50 Computer analysis: Complex Analysis (U352: prog 4).
17.15 Comparative physiology: Respiratory Mechanisms (S203: prog 8).
17.40 Computing and computers: Welfare and Computers in Sweden (T101: prog 7).
18.05 Management in education: Organisation (E203: prog 4).
18.30 Daily religious quest: Islam in Britain (A300: prog 9).
18.50 Biology: Ecosystems & Volcanoes & Volcanic Rocks (S323: prog 5).

RADIO 3 (VHF)
6.00 Technology and society: Technology and Profitability (T232: prog 5).
6.20 Elements of music: Non-Imperial Rome (A341: prog 4).
7.00 Music in Twelfth Night (A307: prog 4).
7.45 Thought and reality: central theme in Wittgenstein: Philosophy of Psychology and the Vienna Circle (A402: prog 6).

RADIO 4 (VHF)
23.40 Arts foundation course: The Shape of Philosophy (A101: prog 15).
24.00 The early Middle Ages: Empire the rise of Christianity: Martial (A201: prog 6).

RADIO 4 (VHF)
Alternative broadcasts for students in Scotland and Wales only
24.00 Fundamentals of statistical inference: Random Variables (M341: prog 3).
00.20 Control and public health: Water Conservation (P172: prog 3).
00.40 Cell, Algae and Water Quality (P701: prog 3

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Universities

UNIVERSITY OF ZAMBIA

Applications are invited for the following posts in the School of Humanities and Social Sciences :—

(1) SENIOR LECTURER AND LECTURER IN AFRICAN DEVELOPMENT STUDIES DEPARTMENT

Candidates should hold a PhD in the Social Sciences/Behavioural Sciences, with teaching and research experience in Development Studies. Special areas of interest should include : development planning, rural development, political economy of development and under-development, development sociology.

(2) PROFESSOR AND SENIOR LECTURER/LECTURER IN BUSINESS AND ECONOMIC STUDIES DEPARTMENT

Candidates should hold a PhD in Economics with either teaching or research experience or both. Special areas of interest for the professorial appointment is either economic statistics, econometrics and economic theory. Special areas of interest for the Senior Lecturer/Lecturer post should include all or some of the following fields : transport, regional planning industrial economics, manpower planning, international economics, public finance and economic theory.

(3) ASSOCIATE PROFESSOR AND SENIOR LECTURER/LECTURER IN POLITICAL AND ADMINISTRATIVE STUDIES DEPARTMENT

Candidates should hold a PhD in Public Administration/Politics with either teaching or research experience or both. Special areas of interest are public policy analysis, personnel administration, politics of industrial societies, and political thought and theory.

(4) PROFESSOR IN SOCIOLOGY STUDIES DEPARTMENT

Candidates should hold a PhD in Sociology and/or Social Welfare with either teaching or research experience or both. Special areas of interest of a Professor in Social Welfare should include, social policy, planning and administration, research methods, evaluative research methods, delivery of services, mental health and drug abuse. Special area of interest of a Professor in Sociology should include development sociology, social change, rural sociology, industrial sociology, social institutions and structure.

Salary scales : Professor K11,352 to K12,324 per annum : Associate Professor K10,056 to K11,028 per annum : Senior Lecturer K8,748 to K9,732 per annum : Lecturer K5,988 to K6,540 per annum (£1 sterling = K1.77). The British Government (ODA) provides salary supplementation in range £2,406 to £8,602 per annum (sterling) (reviewed annually and normally tax-free), and associated benefits. Superannuation or gratuity, housing : family passages ; baggage allowance ; overseas leave.

Detailed applications (two copies), including curriculum vitae and naming three referees, should be sent by air mail to the Registrar, University of Zambia, PO Box 2579, Lusaka, Zambia, by May 31, 1980. Applicants resident in United Kingdom should also send one copy to Inter-University Council, 90/91 Tottenham Court Road, London W1P 0DT. Further particulars are obtainable from either address.

The University of Manchester

APPOINTMENT OF

University Librarian

Applications are invited from candidates with appropriate academic and library experience for the office of University Librarian and Director of the John Rylands University Library which will fall vacant on September 30th, 1980, in consequence of the appointment of Dr. D. W. Ratcliffe as University Librarian in the University of Cambridge. The salary will be commensurate with the high status and responsibility associated with the office.

Further particulars may be obtained from the Registrar, The University, Manchester M13 9PL, to whom applications should be returned by June 2nd, 1980.

SOCIOLOGY DEGREES

(B.A., University of London)

BY PART-TIME STUDY AT GOLDSMITHS' COLLEGE

2-3 evenings a week for lectures, seminars, tutorials (or day-time equivalent). Sociological Theory, Methods of Research and Social Structure—plus choice of options :— Sociology of Art, Literature, Religion, Education : race, inter-personal relations, politics, etc.

Also : Postgraduate study for MPhil, PhD.

Apply NOW for courses starting October 1980 to :— ADMISSIONS OFFICE, Goldsmiths' College, New Cross, London, SE14 6NW. Phone 692 0211, Extn. 297.

THE AUSTRALIAN NATIONAL UNIVERSITY

Scholarships for Ph.D. Degree Courses

Persons who hold, or expect to hold, a bachelor degree with at least upper second-class honours or equivalent from a recognised University and who have a capacity for research, are invited to apply for Australian National University Ph.D. Scholarships.

Fields of Research. Scholarships are tenable in the Institute of Advanced Studies, which consists of Research Schools of Physical Science, Biological Sciences, Social Sciences, Pacific Studies, Chemistry, Earth Sciences and the John Curtin School of Medical Research; in the School of General Studies (Faculties of Arts, Asian Studies, Economics, Law and Science); or in the Centre for Resource and Environmental Studies.

Scholarship Benefits. The basic stipend payable is $A7700 per annum (tax free), with additional allowances for dependants and housing assistance for married scholars. In addition, return air fares and a grant towards removal expenses are provided to scholars normally resident outside Australia.

Tenure. Scholarships are usually tenable for three years and may be taken up at any time of the year.

Closing Date. There is no set closing date, but applicants from outside Australia are advised to apply at least six months before they expect to be available to take up a scholarship.

Full particulars and application forms are available from the Registrar, The Australian National University, P.O. Box 4, Canberra, A.C.T. 2601, Australia, or from the Association of Commonwealth Universities (Appts), 36 Gordon Square, London WC1H 0PF.

NATIONAL UNIVERSITY OF LESOTHO

Applications are invited for two posts of SENIOR RESEARCH FELLOW / RESEARCH FELLOW in INSTITUTE OF SOUTHERN AFRICAN STUDIES in the fields of Economics, Political Science, Sociology, or Social Anthropology. Applicants must have done research on an aspect of one of the following countries, i.e., Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zaire, and Zimbabwe; and be holders of post-graduate University qualifications, must have teaching and research experience; and provide an outline of more than 2,000 words on a major research project (on Southern Africa) they intend to carry out during their time with the Institute. Appointees will be required to participate in the Institute's research and seminar programmes; take part in the teaching of an interdisciplinary MA programme in Southern African Studies offered by the Institute; supervise post-graduate students ; carry out research in area(s) of personal interest. Salary scales (under review) : Senior Research Fellow K7,473-8,433 (£5,052-5,697) p.a. (£1 sterling = K1.77). Non-contributory superannuation or gratuity, housing allowance, inducement allowance to expatriates not qualifying for any supplementation scheme. Accommodation at reasonable rentals ; family passages and baggage allowance. Education allowance, vacation and study leave. Detailed applications (2 copies) including curriculum vitae and naming three referees by 2 June 1980 to the Assistant Registrar (Appointments), National University of Lesotho, PO Roma, Lesotho. Applicants resident in UK should also send 1 copy to Inter-University Council, 90/91 Tottenham Court Road, London W1P 0DT. Further particulars may be obtained from either address.

NATIONAL UNIVERSITY OF LESOTHO

Applications are invited for the post of LECTURESHIP IN DEPARTMENT OF GEOGRAPHY. Applicants should have a comprehensive background in Human Geography with special reference to the problems of developing countries, and should preferably have several years' postgraduate experience in teaching and research. The appointee will be expected to teach in a selection of the following areas : elementary and advanced spatial theory ; statistical techniques in Geography and research methodology ; resource analysis ; human ecology and population geography ; regional science ; socio-spatial aspects of development and underdevelopment, urban and rural problems of developing countries ; principles and practice of urban and regional planning and project planning. Further duties will include the supervision of undergraduate dissertations, administrative tasks within the Department, and Departmental representation at faculty level and on various committees. Salary scale (under review) : R5,493-7,557 p.a. (£1 sterling = R1.77). Non-contributory superannuation or gratuity, housing allowance, inducement allowance to expatriates not qualifying for any supplementation scheme. Accommodation at reasonable rentals ; family passages and baggage allowance ; education allowance ; vacation and study leave. Detailed applications (2 copies) including a curriculum vitae and naming three referees by 2 June 1980 to the Assistant Registrar (Appointments), National University of Lesotho, PO Roma, Lesotho. Applicants resident in UK should also send 1 copy to Inter-University Council, 90/91 Tottenham Court Road, London W1P 0DT. Further particulars may be obtained from either address.

UNIVERSITY COLLEGE DUBLIN

Applications are invited by the Governing Body of the College for the following full-time statutory appointments :

PROFESSORSHIP OF MODERN ENGLISH AND AMERICAN LITERATURE

THE HERITAGE TRUST PROFESSORSHIP OF ENVIRONMENTAL STUDIES (Endowed Chair)

Prior to application, further information (including application procedure) should be obtained from the Secretary and Bursar, University College, Belfield, Dublin 4. Please quote reference number GN72 : telephone enquiries, 639211, extension 431.

The closing date for receipt of completed applications for both of the above posts is Thursday, June 5, 1980.

Colaiste na hOllscoile Gaillimh

LECTURESHIP AND JUNIOR LECTURESHIP IN MATHEMATICS

Applications are invited for the above posts.
Salary scales :
LECTURESHIP : £9,262 × (8)—£12,185.
JUNIOR LECTURESHIP : £6,234 × (10)—£8,570
The closing date for receipt of applications for the Lectureship (which has already been advertised) is being extended to coincide with the closing date for receipt of applications for the Junior Lectureship, which is 14 May, 1980.

In the case of the Junior Lectureship, while no field or specialisation is excluded, applications will be particularly welcome from candidates with an interest in numerical analysis and related fields.

Further information may be obtained from the Registrar, University College, Galway, Ireland.

UNIVERSITY OF NOTTINGHAM

Research Associates in Continuing Education

Two Research Associates (just Midlands based, one required for 18 months and 12 months respectively to work on a DES sponsored evaluation of the Training of Part-time Teachers of Adults. One person is required to start as soon as possible, the other in October, 1980.

The work is a testing project with experience of adult education, particularly in the LEA sector, who between them provide knowledge of experimental and survey design, statistical and qualitative analysis, interview techniques. Strong word processing.

Salary: £4,144 per annum.

Informal enquiries to: Mr. Jeffrey Thomas, Ref. R. Graham, 0602 42021 or 0602 7[illegible]. Applications, quoting reference R/Graham, to Mrs. T. Sullivan, 0602 56101, Ext. 3127, and letters of application, not to exceed (c.) Dr. Director, National Institute of Adult Education, 35 Stoneygate Avenue, Stoneygate, Leicester LE2 2QH (Closing date, earliest Research Associate).

BELFAST

THE QUEEN'S UNIVERSITY

RESEARCH ASSISTANT

DEPARTMENT OF CHEMISTRY

Applications are invited for a two year Research Assistantship in the Department of Chemistry for a period of two years from 1 October, 1980. One Demonstrator will be enough to fill a small group developing solid state studies for the Department's chemical dimensions and the other to work in solid state physics.

Initial salary in the range £4,469 to £5,062 per annum (under review), with Superannuation benefits. Superannuation will be within National Grade IA or IB, plus superannuation.

Applications (three copies) naming three referees and indicating which of the two studies for which one should be sent to Dr. [illegible], Chemistry, The Queen's University of Belfast, BT9 5AG, by 30 May, 1980. Closing date: 30 May, 1980.

HULL

THE UNIVERSITY

TEMPORARY LECTURESHIP IN MIDDLE EAST POLITICS

Applications are invited for a Temporary Lectureship in the Department of Politics (starting September 1980 and ending 31st October, 1981) to teach a specialised course on the Middle East, with special emphasis on Israel, Palestine, Lebanon, Syria, politics.

Salary on the scale £7,273 to £10,484 per annum.

Applicants should have a first or upper second class honours degree, preferably in Politics, and should have a good knowledge of the Middle East, and be able to teach a wide range of courses in the Politics of the Middle East.

Applications (three copies) including a curriculum vitae and the names of three referees, should be sent to the Registrar, The University, Hull HU6 7RX, from whom further particulars may be obtained. Quote Ref. RV.[illegible]

DURHAM

THE UNIVERSITY

DEPARTMENT OF PHYSICS

Applications are invited for two Research Assistantships in the Department of Physics for a period of two years from 1 October, 1980. One Demonstrator will be enough to fill a small group developing solid state studies for the Department's chemical dimensions and the other to work in solid state physics.

Initial salary in the range £4,469 to £5,062 per annum (under review), with Superannuation benefits. Superannuation will be within National Grade IA or IB, plus superannuation.

Applications (three copies) naming three referees and indicating which of the two studies for which one should be sent to Dr. [illegible], Chemistry, The Queen's University of Belfast, BT9 5AG, by 30 May, 1980. Closing date: 30 May, 1980.

MANCHESTER

THE UNIVERSITY

LECTURER IN GERMAN

Applications are invited for a Lectureship in German, tenable from 1 October, 1980. Candidates with a specialisation in 20th Century German literature should have a PhD or equivalent qualification, and should be able to teach a wide range of courses in German Language, Literature, Culture and Society.

Salary scale : £7,273 to £10,484 per annum.

Applications (three copies) including details of qualifications, age, experience and the names of three referees, should be sent to the Registrar, The University, Manchester M13 9PL, from whom further particulars may be obtained. Quote Ref. 79/80/TES.

Universities continued

NATIONAL UNIVERSITY OF LESOTHO

Applications are invited for the post of

PROFESSOR OF ECONOMICS

from well qualified and experienced economists in any field who can provide the leadership for a growing department. It would be an advantage if the appointee has some experience in one or more of the following fields—macro-economic planning, international economics, monetary economics, econometrics. The appointee would be expected to have a balanced interest in teaching and research. The Department has considerable involvement with Government and Aid Agencies in policy and project research in addition to conducting a full teaching programme. Salary: R5,360-10,000 (under review) p.a. (£1 sterling equals R1.77). Non-contributory superannuation or, gratuity, 15 per cent inducement allowance for expatriates not qualifying for any supplementation scheme. Accommodation at reasonable rentals; family passage and baggage allowance. Education allowance; Vacation and study leave. Detailed applications (2 copies) including a curriculum vitae and naming three referees by 2 June 1980 to the Assistant Registrar (Appointments), National University of Lesotho, PO Roma, Lesotho. Applicants resident in UK should also send one copy to Inter-University Council, 90/91 Tottenham Court Road, London W1P 0DT. Further particulars may be obtained from either address.

LIVERPOOL

THE UNIVERSITY

SCHOOL OF BUSINESS STUDIES

LECTURESHIP IN MARKETING

Applications are invited from good HONOURS GRADUATES with an MBA or equivalent qualification, and preferably some industrial experience for a LECTURESHIP IN MARKETING.

Preference will be given to candidates who are also able to offer a course in Business Policy to our MBA Students. The post is tenable from October 1st, 1980.

Duties include teaching at both undergraduate and postgraduate levels and an interest in developing post experience work is sought. The appointee will be encouraged to develop his particular research interest. The salary will be in the range £6,092 to £7,077 per annum.

Applications, together with the names of three referees, should be sent by 31st May, 1980, to the Registrar, The University, Liverpool L69 3BX. Please quote Ref. 80/[illegible] from whom further particulars may be obtained. Quote Ref. RV.[illegible] THES.

LONDON

KING'S COLLEGE

THREE RESEARCH STUDENTSHIPS IN GERONTOLOGY

Sponsored by the Social Science Research Council

Applications are invited from holders of a good honours degree or the equivalent, or who expect to attain such qualifications in 1980 for :—

One three STUDENTSHIP for research training, preferably in a social science discipline, although other disciplines will not be excluded.

Two LINKSTAFF STUDENTships each for two years' research training linked to the following projects :

(i) The nature, purpose and content of Day Hospital units in Britain during the 1970's.

(ii) Locational criteria of housing for the elderly.

Stipends (quoting Ref. 1/63) for details, and application form to Personnel Section (Academic), KCL, Cardiff CF1 3NU.

Closing Date: 23 May, 1980

LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY

ENGINEERING MATHEMATICS

Applications are invited from suitably qualified persons for a

LECTURESHIP

in the Department of Engineering Mathematics. Applicants should be qualified mathematicians or mathematically inclined engineers and have research interests in some branch of engineering mathematics.

Salary within scale £5,052-£10,484 (under review). It is hoped to appoint within the lower half of the scale. Further details and application forms available from Paul Johnson, Establishment Officer, Ref. 80/15 AM.

Loughborough Leicestershire

KEELE

THE UNIVERSITY

TEMPORARY LECTURESHIP IN INTERNATIONAL RELATIONS

Applications invited for TEMPORARY LECTURESHIP in INTERNATIONAL RELATIONS tenable for one year (postponeable for 1981-82) ; special consideration will be given to applicants who can offer Politics for teaching as their second subject.

Salary on the 3 points of the Lecturer Grade, currently £6,092-£7,077 per annum, with contribution to University Superannuation Scheme.

Application forms and further particulars may be obtained from the Registrar, The University, Keele, Staffordshire ST5 5BG, to whom completed applications should be returned by 30 May, 1980.

The University of Toronto

LECTURESHIPS/SENIOR LECTURESHIPS IN ACCOUNTING

The University invites applications for a lectureship or senior lectureship in accounting or business [illegible] to commence duties shortly after the end of the academic year 1980-81. Candidates should be familiar with computer applications for related accounting and business research purposes. The successful candidate will be expected to take up duty at the earliest possible date.

Salary: [illegible] Lecturer $[illegible] to $[illegible] Senior Lecturer $[illegible] to $[illegible] Associate Professor $[illegible] to $[illegible] Professor $[illegible] to $[illegible]

Application forms and further information are obtainable from the Chairman, Department of Accounting and Business Administration, University of Toronto, Toronto, Ontario, Canada M5S 1A1 (Telephone: [illegible]) to whom applications should be addressed. Closing date: [illegible] 1980.

Professor P. B. M. [illegible] will be in London from [illegible] June and would be pleased to see candidates.

BUCKINGHAM

THE UNIVERSITY COLLEGE

SENIOR LECTURER/LECTURER IN ACCOUNTING

Applications are invited from suitably qualified and experienced men or women to teach degree courses in Accounting and Financial Management and for the post graduate Diploma in Business Economics from October 1, 1980. Those who are be required to teach developing courses to meet needs of industry and practising accountants.

Salary reflecting qualifications and experience : [illegible]

Further particulars from the Academic Registrar, The University College of Buckingham MK18 1EG, with whom applications should be lodged by May 30.

LONDON

THE UNIVERSITY

DEPARTMENT OF EXTRA-MURAL STUDIES

AN INFORMATION OFFICER is required in the above department which deals with teaching facilities for adult education. Responsibilities will include assisting on student, design and production of all departmental publications for principal, tutors, teaching publications, advertising requirements, dissemination of information and publicity. The ability to liaise and work with the press and other media and to make use of effective advertising in appropriate publications is essential.

Salary on the scale £4,402 to £5,750 per annum (under review) plus £750 per annum London Allowance.

Particulars and application form obtainable from the Personnel Officer, University of London, Senate House, Malet Street, London, WC1E 7HU. Closing date for applications May 23, 1980.

MALAWI

THE UNIVERSITY

BUNDA COLLEGE OF AGRICULTURE

Applications are invited for the following posts, tenable from September 1, 1980:

(1) RURAL DEVELOPMENT DEPARTMENT

SENIOR LECTURER/LECTURER IN FARM MANAGEMENT. Candidates should have a good first degree in agriculture economics and postgraduate qualifications in one of the following areas: marketing, agricultural economics or development economics. Duties will include teaching of marketing and farm management in both diploma and degree students. The appointee will be expected to carry out research in some aspect of farm management.

(2) LIVESTOCK DEPARTMENT

(a) LECTURER IN ANIMAL NUTRITION. Candidates should have a good degree in animal husbandry or veterinary science qualifications in animal nutrition. Duties will include teaching on feeds and feeding and animal nutrition to diploma and degree students. The appointee will be expected to carry out research in some aspect of animal production.

(b) LECTURER IN AGRICULTURAL CHEMISTRY. Candidates should have an honours degree in agricultural chemistry, chemistry or bio-chemistry with postgraduate qualifications in any one of the three areas. Duties will include teaching chemistry and biochemistry to diploma and degree students respectively. The appointee will be expected to carry out research in some aspect of animal production.

Salary scales: Senior Lecturer, K6,600 to K8,400 per annum; Lecturer, K4,500 to K6,600 per annum. (£1 sterling equals K1.26). In the very exceptional circumstances the British Government may provide supplementation in range £4,051 to £8,736 per annum (married) or $3,288 to $4,425 per annum (single) (sterling) reviewed annually and normally tax free) and associated benefits, if no supplementation available the University may pay an addition in range K1,026 to K1,650 per annum (married) (sterling) (normally 15 to 20 per cent inducement allowance) depending on circumstances various allowances; biennial overseas leave; housing.

Application forms (four copies) and further details are available from the Registrar, University of Malawi, University Office, P.O. Box 278, Zomba, Malawi and must be returned to him by June 1, 1980. Applicants resident in United Kingdom should also send one copy to Inter-University Council, 90-91 Tottenham Court Road, London W1P 0DT. Further details and application forms are obtainable from Inter-University Council.

EDINBURGH

THE UNIVERSITY

INSTITUTE FOR ADVANCED LANGUAGE STUDIES

TWO POSTS OF DIRECTOR OF COURSES

The Institute has recently been set up within the University to support research and development in the field of Applied Linguistics by offering courses in English as a foreign language.

The Institute is establishing two new posts of Director of Courses, each post will be responsible for securing continuing development of a specialist area, covering the whole world area, one for Middle East, Gulf, Europe, Middle East, General Purpose, Far East, Indian Ocean Rim and Pacific Rim. Conditions of service are those of a collegiate University, substantially based on those of Universities and Colleges Staff Joint Negotiating Committee, 1978 (Blue Book). Initial contract initially starting date by Agreement.

Further particulars may be obtained from the Secretary, Institute for Advanced Language Studies, 19 George Square, Edinburgh EH8 9LL, to whom applications should be addressed, quoting reference 7006, not later than May 30, 1980.

MANCHESTER

THE UNIVERSITY

INSTRUMENTATION AND ANALYTICAL SCIENCE

UMIST is in the process of building two professorial appointments in Instrumentation and one professorial appointment in Analytical Science as part of a vigorous new and which will certainly operate as a second department designed to respond to the new industrial revolution and the challenges made on industry in terms of research and education.

The Institute is now seeking suitably qualified candidates for posts at the following levels :

(1) Lecturers, £4,052 to £10,484 per annum.

(2) Experimental Officers, £4,402 to £9,769 per annum.

(3) Research Assistants, £4,052 to £9,769 per annum.

Applicants should possess a wide experience of or interest in one or more of the following areas, which are not in [illegible]

(1) TRANSDUCER TECHNOLOGY.

(2) INSTRUMENTATION of COMPLEX SYSTEMS.

(3) NOVEL TRANSDUCER SYSTEMS FOR TRACE ANALYSIS.

(4) ANALYTICAL PLASMA EMISSION SPECTROSCOPY.

(5) ANALYTICAL PHOTOACOUSTIC SPECTROSCOPY.

(6) DESIGN OF LARGE SCALE INTEGRATED CIRCUITS.

(7) MICRO-PROCESSOR APPLICATIONS.

(8) BIOMEDICAL INSTRUMENTATION.

Requests for application forms and further particulars quoting the following reference (1) Lecturer (Ref. IAS/51/Cd.) (2) Experimental Officer (Ref. IAS/52/Cd.) (3) Research Assistant (Ref. IAS/53/Cd.) should be sent to the Registrar, Room 8d, UMIST, P.O. Box 88, Manchester M60 1QD. The closing date is 16 May, 1980.

READING

THE UNIVERSITY

PROFESSORSHIP OF LAW

Applications are invited for the Professorship of Law (Second Chair). There is no stipulated area for the field of interest, except that candidates should have a specialism and be concerned within the central area of legal studies.

The appointment will be made from a date to be arranged.

Further information may be obtained from the Registrar (Room 234), Whiteknights (Box L), The University, Whiteknights, Reading RG6 2AH, to whom applications should be received not later than 22 September, 1980.

SHEFFIELD

THE UNIVERSITY

CENTRE FOR RESEARCH ON USER STUDIES

INFORMATION OFFICER

Applications are invited for the above post in the Centre for Research on User Studies. A research centre supported by the British Library R & D Department, the post, tenable to December, 1981, in the first instance, involves maintaining a small specialist library and providing information in a range of topics relating to studies of users of information sources and services, as well as assisting the Centre's publication and educational programme.

Salary in the range £5,052-£6,726 a year.

Particulars from the Registrar and Secretary, The University, Sheffield S10 2TN to whom applications should be sent by 23rd May, 1980. Quote Ref : R444/SU.

ST. ANDREWS

THE UNIVERSITY

DEPARTMENT OF SPANISH

Applications are invited for a Temporary Lectureship in the DEPARTMENT OF SPANISH, tenable for 9 months from January to March 1981. Preference will be given to candidates with a research degree where such is relevant to the prose literature of the 16th and 17th Centuries. Teaching will be at all levels, including elementary language instruction.

Salary on appropriate point within range £5,052 to £6,726 per annum.

Applications (two copies) preferably by airmail, should be sent, together with the names of three referees, not later than 30 May, 1980, with the Establishment Officer, The University, College Gate, St. Andrews, Fife.

SOUTH AFRICA

UNIVERSITY OF THE WITWATERSRAND

Johannesburg

JAN SMUTS CHAIR OF INTERNATIONAL RELATIONS

Applications are invited from suitably qualified persons for appointment to the above Chair.

The Department of International Relations offers three undergraduate courses, the University's general B.A. degree and also an honours course in International Relations. The Department is housed in the same building and offers joint seminars with the South African Institute of International Affairs.

The salary attached to the post is within the scale R[illegible] 100 x 8 = R[illegible] to R[illegible] 200 x 8 = R[illegible].

The initial salary and level of appointment will be determined according to qualifications, experience and suitability. Consideration will be given to making either permanent or contract appointments.

The University's policy is not to discriminate in the appointment of staff or the selection of students on the grounds of sex, race, religion or colour. Further particulars relating to this practice and to the above post are included in an information sheet, obtainable from the London Representative, Universities of the Witwatersrand, Manchester House, 329 High Holborn, London WC1V 7QP, or from the Registrar (Staffing), University of the Witwatersrand, Jan Smuts Avenue, Johannesburg, South Africa, with whom applications should be lodged by 30th June, 1980.

Polytechnics

The Polytechnic : Wolverhampton

RESEARCH ASSISTANTS

Required for work on the following research projects from 1 October 1980. Successful applicants will normally be expected to register for a higher degree of the Council for National Academic Awards.

Art and Design
An investigation in the use and application of refractory fibres in the construction and firing of small furnaces and kilns.

Education
Curricula provision in schools for "understanding industry" and implications for future provision and teacher education.

Engineering
Microprocessor control of electro-hydraulic stepping motors applied to a 2-axis NC drive system.

European Studies
An analysis of the determinants of private and public sector collective bargaining systems and their relative effects on wages and employment in selected countries of Western Europe.

Humanities
A social history of nineteenth-century colliery surface workers, with particular reference to the Staffordshire coalfields.
An exploration of some aspect or aspects of the inter-relationships between literature and its criticism.

Science
Role of peroxisomal fatty acid oxidation in animal models of obesity.
New strategies for the solid phase synthesis of human pituitary peptides of medical importance.
An investigation into the implementation of a data-base machine using a microprocessor computer system.

Social Science
Roles of the U.K. and continental stock markets in industrial investment.

Interviews will be held in June/July 1980. Research Assistant posts are normally tenable for a two or three year period. Current salary starts at £5,676 per annum. Further details and application form (to be returned by 30 May 1980) from:
"Personnel" (Ra RA posts), The Polytechnic, Wulfruna Street, Wolverhampton WV1 1LY.
Telephone Wolverhampton 27371 (24-hour Ansafone service).

NEWCASTLE UPON TYNE POLYTECHNIC

School of Surveying

HEAD OF SCHOOL

Applications are invited for this important new post which arises as a result of Polytechnic re-organisation.

The responsibilities of the person appointed will be mainly involved with leading the academic advancement of the work of the school, the oversight of staff and subject development, and generally promoting the school within the Surveying Profession.

The Polytechnic currently offers CNAA (first degrees in General Practice Surveying and Quantity Surveying and part-time courses for the professional examinations of both disciplines.

Applicants should be professionally qualified and preferably hold a higher degree.

Burnham F. E. Head of Department Grade IV : £8,303-£10,431 p.a. inclusive.

For further details and application form, returnable by 16th May, 1980, please call (24 hour telephone answering service 0632 26124) or send a stamped addressed envelope to the Personnel Officer, Newcastle upon Tyne Polytechnic, Ellison Building, Ellison Place, Newcastle upon Tyne NE1 8ST.

Polytechnics continued

LECTURING OPPORTUNITIES

PRINCIPAL LECTURERS

required in the following areas:

BUSINESS STUDIES (Course tutor for BA Business Studies course)
BUSINESS STUDIES (To co-ordinate BEC courses)
ELECTRICAL AND ELECTRONIC ENGINEERING
ENVIRONMENTAL HEALTH
HOUSING ADMINISTRATION
LAW
PLANT ENGINEERING

LECTURER II/SENIOR LECTURERS

required in the following areas:

ACCOUNTING (preferably in public service accounting)
COMPUTING (Data Processing and Systems)
CONTROL ENGINEERING
DRAMA
ELECTRICAL AND ELECTRONIC ENGINEERING
EUROPEAN BUSINESS (Specialism in either economics, business organisation or marketing)
HOUSING ADMINISTRATION/ ESTATE MANAGEMENT
MANAGEMENT SHORT COURSES (Marketing and sales management)
MANAGEMENT SHORT COURSES (Management development and training, or general management subjects)
MANUFACTURING PROCESSES AND PRODUCTION ENGINEERING
MATHEMATICS
MICROPROCESSOR APPLICATIONS (2 posts)
MINING ENGINEERING AND/ OR OCCUPATIONAL SAFETY (2 posts)
NURSING STUDIES
PHYSICAL EDUCATION
QUANTITATIVE METHODS
SOCIAL WORK

Salary scales:—
Principal Lecturer £8,256-£9,162 (Bar)—£10,362 (Under review)
Lecturer II/Senior Lecturer £4,806-£7,286 (Bar)—£8,871

Application forms and further details from The Assistant Director (Administration), Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Forms to be returned as soon as possible. Please enclose self-addressed foolscap envelope to assist with speedy despatch of documents.

TRENT POLYTECHNIC NOTTINGHAM

SHEFFIELD CITY POLYTECHNIC

DEPARTMENT OF COMPUTER STUDIES

REF: 51/THES

PRINCIPAL LECTURER
SENIOR LECTURER in Computer Studies
LECTURER II

Applicants may be considered at any of the above grades for lecturers in Systems Analysis and Design (two posts) and Computer Architecture/Software for mainframe and microcomputer systems (one post). Applicants at Senior and Principal Lecturer level will be expected to demonstrate a more advanced understanding of their subject area than those at Lecturer II and may be required to take responsibility for placing students in industry.

Industrial experience would be an advantage.

Salary Scales:
Principal Lecturer, £8,256-£9,162 (bar) £10,362.
Senior Lecturer, £7,092-£8,280 (bar) £8,871.
Lecturer II, £4,806-£7,686.

DEPARTMENT OF BUILDING

REF: 52/THES

LECTURER II IN CONSTRUCTION TECHNOLOGY

Salary Scale: £4,806-£7,686.

Applicants should possess relevant qualifications and suitable contracting and/or professional experience and be fully experienced in Construction Technology. Full or part-time teaching experience is essential. The successful applicant will be required to teach degree and higher technician level courses as well as carry out some research.

Application forms and further details can be obtained from the Personnel Officer, Sheffield City Polytechnic, Hallamshire House, Fitzalan Square, Sheffield S1 2BB, or by telephoning 0742 20911, ext. 387. Completed forms quoting the appropriate reference should be returned by 23 May, 1980.

Leeds POLYTECHNIC

Applications are invited for the following posts:—

SCHOOL OF LAW

All applicants should have good honours law degrees of a UK University or Polytechnic, be professionally qualified as a Solicitor or Barrister and be experienced beyond articles or pupillage.

LECTURER II IN LAW—TWO POSTS

Able to teach Law Society Final students procedural and substantive Law relating to civil and criminal procedure evidence and one of: Solicitors' accounts; private company formation, operation and liquidation; taxation.

LECTURER II IN LAW—ONE-YEAR TEMPORARY POST

To teach any three of the following to honours Law degree students and to degree students of other disciplines: Administrative Law, Trusts, Company Law, Commercial Law.

SCHOOL OF ACCOUNTING AND APPLIED ECONOMICS

LECTURER II IN ECONOMICS

To teach the subject in a multi and interdisciplinary framework on degree, professional and diploma courses. Opportunity for specialization in financial or industrial economics. Relevant first degree with either postgraduate or professional qualification and/or relevant work experience.

SCHOOL OF ELECTRICAL ENGINEERING

SENIOR LECTURER IN ELECTRONICS AND COMMUNICATION ENGINEERING

To teach, research and develop an area of Communication Systems Engineering. An interest in hardware and software applications of microprocessors desirable. Relevant industrial experience essential. Teaching experience and chartered engineer status an advantage.

SCHOOL OF MECHANICAL AND PRODUCTION ENGINEERING

LECTURER II IN DYNAMICS APPLIED TO MANUFACTURING PROCESSES

To teach Dynamics on HND and HTC courses as well as the Dynamics of machine tools and manufacturing processes on the Production Engineering Honours Degree course. To take responsibility for the development of a major laboratory in this field.

To discuss the post informally contact Dr R E Schofield, Head of School on Leeds (0532) 462743.

SCHOOL OF MANAGEMENT AND BUSINESS STUDIES

LECTURER II IN PERSONNEL MANAGEMENT/ INDUSTRIAL RELATIONS—ONE-YEAR TEMPORARY POST

Ability to teach across a number of courses at undergraduate, postgraduate and post-experience levels.

LECTURER II IN MARKETING STUDIES—ONE-YEAR TEMPORARY POST

A degree and practical marketing experience essential. Able to teach on a range of courses from undergraduate to postgraduate and post-experience.

SCHOOL OF SOCIAL STUDIES

LECTURER II IN SOCIAL STUDIES—ONE-YEAR TEMPORARY POST

A qualified Social Worker preferably with a good Social Science degree to teach Social Work and/or Sociology and assist with tutorials, placement visits and course administration on two-year non-graduate CQSW course.

SCHOOL OF TOWN PLANNING

LECTURER II IN TOWN PLANNING—ONE-YEAR TEMPORARY POST

To participate in studio work, seminars and tutorials on undergraduate and postgraduate courses in Planning. To assist in teaching Transport Planning.

COMPUTER UNIT

LECTURER II—COMPUTER SOFTWARE ADVISER TWO POSTS

Experienced computer staff required to join a team of Software Advisers providing support for a Honeywell DPS 44 and various microcomputers in an educational environment. One post with responsibility for a rapidly expanding Schools service (Schools Liaison). The second post with primary responsibility for the organization of a comprehensive information service (Information). NJC Conditions of Service.

Salary Scales:
Senior Lecturer: £7,092-£8,280 (bar) £8,871.
Lecturer II: £4,806-£7,686.

Details from:
The Services Officer, Leeds Polytechnic, Calverly Street, Leeds LS1 3HE. Tel: 0532 462355.

Closing Date: 19 May, 1980. Please enclose s.a.e.

BRISTOL
THE POLYTECHNIC
DEPARTMENT OF DESIGN
PUBLISHING LECTURER
HEAD OF SCHOOL OF THREE DIMENSIONAL DESIGN
(Ref. No L16/34)

Applications are invited for a Head of the newly formed School which covers the use of wood, metal and plastics within the Department of Design.

Applicants should be able to demonstrate a proven ability as working designers in the Three Dimensional Design field and also the ability to provide effective leadership in the development of the School. Professional experience in product/industrial design is essential and experience in higher education is desirable.

Duties to commence on 1st September, 1980.

Salary Scale £8,256-£9,162-£9,989-£10,362 per annum.

For further details and an application form, to be returned by 21st May, 1980, please contact Personnel Office, Bristol Polytechnic, Coldharbour Lane, Frenchay, Bristol BS16 1QY.

Please quote appropriate Reference Numbers in all Communications.

LONDON, N.7.
THE POLYTECHNIC OF NORTH LONDON
DEPARTMENT OF MANAGEMENT STUDIES
RESEARCH ASSISTANT

An honours GRADUATE is required to work on a project profiling the funding of Health Education. Candidates should have a good degree in Social or Business Studies and be capable of conducting interviews concerned with the area of business control.

Salary Scale: £3,498 to £5,498 plus £609 London Allowance.

Application forms and further particulars obtainable from the Departmental Secretary, Department of Management Studies, Marlborough House, 364 Holloway Road, London, N.7.

OXFORD
THE POLYTECHNIC
DEPARTMENT OF GEOLOGY AND PHYSICAL SCIENCES
LECTURERS OR SENIOR LECTURERS IN GEOLOGY
(two posts)

Applications are invited for the above posts, tenable from 1 September, 1980. The main teaching responsibilities of one post will be in the fields of Sedimentology and Stratigraphy and those of the other will be in Economic Geology. Successful applicants for both posts will be expected to take a full part in the Department's Geology training programme and to carry out research.

Salaries: Senior Lecturer £7,092 to £8,871; Lecturer £4,806 to £7,686 (under review). (Transfer from Lecturer II to Senior Lecturer is, subject to efficiency requirements, automatic.)

Applications, including a curriculum vitae and the names of three referees, should be sent by 16 May, 1980, to the Head of Department of Geology and Physical Sciences, Oxford Polytechnic, Oxford, OX3 0BP, from whom further particulars and application forms may be obtained.

OXFORD
THE POLYTECHNIC
DEPARTMENT OF SOCIAL STUDIES

PRINCIPAL LECTURER in SOCIAL WORK (readvertise-ment). Salary: £8,001 (bar) to £10,143 (bar) to £11,268; subject to confirmation.

Applications are invited from persons with appropriate qualifications and experience in social work. This appointment will bring the full-time staffing for the two-year CQSW course approved CQSW course (annual intake 30) up to full establishment. The Principal Lecturer will for the time being take charge of the course.

Applications, including a curriculum vitae and the names of three referees, should be sent by 30 May, 1980, to the Head of Department, Oxford Polytechnic, Oxford, OX3 0BP, from whom further particulars and application forms may be obtained.

LONDON
THE POLYTECHNIC OF NORTH LONDON
DEPARTMENT OF MATHEMATICS

SENIOR LECTURER/ LECTURER II IN DATA PROCESSING

Candidates should have a good honours degree or postgraduate qualification which includes a substantial element of computer science, or possess an M.I.C.S. by examination. They should have practical experience in the Data Processing field. The Department offers C.N.A.A. B.Sc. (Honours) courses in Mathematics and Computing, Statistics and Computing, and Mathematics and Statistics, an H.N.D. course in Mathematics, Statistics and Computing and part-time courses for a postgraduate Diploma in Computing.

The Polytechnic has a DEC KL1091 computer system providing a general multi-access and batch processing service. The Department has a range of microprocessor systems.

Salary Scales:
Senior Lecturer: £7,092 to £8,280 (bar to £8,871 plus £609 London Allowance (Lecturer (Grade II) £3,806 to £7,686 plus £609 London Allowance. Salary scales in accordance with Burnham interim award and subject to confirmation of the award. The form (Grade II) is one from which progression to the Senior Lecturer scale, subject to satisfying an efficiency requirement.

Application form and further particulars may be obtained from the Recruitment Officer, The Polytechnic of North London, Holloway Road, N7 8DB.

Closing date 14 days from the appearance of this advertisement.

LONDON
THE POLYTECHNIC OF NORTH LONDON

TEMPORARY LECTURER IN HUMAN GEOGRAPHY

Applications are invited for the appointment of a temporary PRIMARY LECTURER II to cover the sabbatical absence of staff for the period from 1st September, 1980 to 30th April, 1981.

Candidates should have a good Honours degree and substantial teaching experience. Relevant teaching experience also desirable.

Salary Scale £4,806-£7,686 (Salary scale is accordance with the Burnham interim award subject to formal agreement).

Further particulars and application form from the Personnel Office, The Polytechnic, North London, Holloway Road, London N7 8DB.

Closing date: 14 days from the appearance of this advertisement.

PRESTON
THE POLYTECHNIC

Applications are invited for the post of ADMINISTRATIVE ASSISTANT to be in Faculty of Science and Technology. Applicants should be graduates or possess equivalent qualifications.

Salary scale: £3,498 to £5,498.

Application forms and further details from the Personnel Officer, Lancashire Polytechnic, Preston PR1 2TQ, quoting reference number 80/7/THES. Closing date May 14, 1980.

Fellowships and Studentships

CANTERBURY
UNIVERSITY OF KENT
FACULTY OF SOCIAL SCIENCES
URBAN STUDIES

Students wishing to undertake research degrees (M.Phil. or Ph.D.) in Urban Studies are invited to apply for full-time or part-time places and to apply S.S.R.C. research studentships.

Specialisms include work on the political economy of the and regions, urban politics and policy-making, labour market, the informal economy, transport and urban analysis. Other fields are not ruled out.

For further information and application forms, please contact the Senior Assistant Registrar, Faculty of Social Sciences, The Registry, The University, Canterbury CT2 7NZ, quoting reference 80/10/80.

INDUSTRIAL RELATIONS RESEARCH UNIT
of the
SOCIAL SCIENCE RESEARCH COUNCIL
UNIVERSITY OF WARWICK

Applications are invited for the post of RESEARCH FELLOW.

SENIOR RESEARCH FELLOW

Senior Research Fellows are scholars with a distinguished research record who are able to combine their own research programme with the Unit's programme. Applications are invited from persons with a record of research publication and experience in the field of industrial relations. Salary Scale: £8,256-£9,162-£9,989-£10,362 per annum.

Lecturer: Applications are invited from persons who have a capacity to undertake research and who are able to contribute to the teaching programme of the Unit. Salary Scale: £4,806-£7,686 per annum.

Applicants will be required to submit with their application, a project outlining a research they would undertake if appointed. Application forms and further particulars can be obtained from the Assistant Registrar, Industrial Relations Research Unit, University of Warwick, Coventry CV4 7AL, to whom the completed applications should be returned by the closing date, 23rd May, 1980.

Research Posts

LONDON, N.W.11

INSTITUTE OF FAMILY AND ENVIRONMENTAL RESEARCH

Seeks an experienced enterprising Social Researcher capable of leading a multi-disciplinary project and with potential to take a major role in the Institute's future development.

Salary at University Scale at Reader level. Please write a full letter of application containing all relevant information to: Director, IFER, 877a Finchley Road, LONDON NW11 8RR.

MANCHESTER
THE UNIVERSITY

RESEARCH ASSISTANT (Ref. No. 80/7) in the Department of Adult Education, University of Manchester, Manchester M13 9PL, to assist in the development of a new Diploma in Adult Education and related research. Applicants should hold an honours degree in Adult Education or Education, Sociology, Psychology, Humanities or Social Studies. Salary £4,806-£7,686 per annum.

Further particulars and application forms may be obtained from the Registrar (Ref. No. 80/7), The University, Manchester M13 9PL, to whom they should be returned by 14 May, 1980.

Research Posts continued

Policies for Microprocessors

Policy Studies Institute (the independent research institute formed by the recent merger of CSSP and PEP) is engaged on a three-year research project on microprocessor applications in industry, commerce and services, using case studies of firms to identify the key factors encouraging and impeding the use of the new technology and to examine the impact of government measures. The project should make a direct and practical contribution to public policy in this important field.

We have nearly finished our first studies of manufacturing industries and will go on to other industries and other sectors, such as distribution, finance, education, health and public administration and to particular aspects, such as the supply of microprocessors and of input and output devices, information flows, training needs and provisions and management and labour attitudes.

We are needing more people with good qualifications (probably in economics, management studies, computer studies or engineering) and, more important with relevant experience—for example, in comparable industrial research projects, in consultancy (economic, electronics, management) or in microelectronics applications—who can interview effectively at all levels, write clearly and produce useful results under pressure.

Work could be full-time, or part-time for a limited period for specialist inputs. Salary £6,000-£12,000 (or part-time equivalent); depending on experience. Please write, by May 20, with particulars of experience, qualifications, etc., to

Jim Northcott
POLICY STUDIES INSTITUTE
1/2 Castle Lane, London SW1E 5DR
01-828 7055

Institute of Family and Environmental Research

Seeks an experienced enterprising Social Researcher capable of leading a multi-disciplinary project and with potential to take a major role in the Institute's future development.

Salary at University Scale at Reader level. Please write a full letter of application containing all relevant information to: Director, IFER, 877a Finchley Road, LONDON NW11 8RR.

DEPARTMENT OF METALLURGY AND SCIENCE OF MATERIALS
UNIVERSITY OF OXFORD

POSTDOCTORAL RESEARCH POSTS

1. Electrical and mechanical properties of dislocations in semiconductors and insulators. (Involving electron optical, spectroscopic and other techniques).
2. Hydrolytic weakening of quartz and silicates. (Structure, velocities of glide and climb of dislocations in quartz, using x-ray and electron microscopic techniques.)

Salary range £5,059-£6,759 (under review). Further details obtainable from and applications including names and addresses of two referees, as soon as possible, to Administrator, Department of Metallurgy and Science of Materials, University of Oxford, Parks Road, Oxford OX1 3PH.

university college of swansea

Research Assistant

Applications are invited for the vacancy of Research Assistant in the Department of Geography, to work on an SSRC/Sports Council project on the changing patterns of work and leisure in South Wales, under the supervision of Dr. D. T. Herbert and Dr. R. J. Thomas. Applicants should be graduate social scientists with research experience (preferably in social survey and related data analysis is desirable).

The appointment, which will be for two years from 1 August, 1980, will be on a scale up to £5,735 per annum in the first year, plus USS/USDPS benefits. Further inquiries may be made to Dr D. T. Herbert, but applications (two copies) and further particulars must be obtained from the Personnel Officer, University College of Swansea, Singleton Park, Swansea SA2 8PP, to which office they should be returned by Friday, 23 May, 1980.

EAST ANGLIA
THE UNIVERSITY
Norwich

Applications are invited for a NERC-funded post of RESEARCH ASSOCIATE to undertake computer processing of occasional current data in connection with a study of water masses in a seasonally eddy in the N.E. Atlantic.

Applicants should have, or expect to obtain, a good honours degree in Computing Science or in a physical science with experience in Fortran programming. Some knowledge of oceanography would be an advantage but it is not essential.

The appointment is for two years commencing September, 1980, and the salary will be on a scale £4,402 to £5,302 per annum.

Applications, to include the names of two referees, should be sent by May 23, 1980, to Dr. D. G. Harvey, School of Environmental Sciences, UEA, Norwich NR4 7TJ, from whom further information may be obtained.

LIVERPOOL
THE UNIVERSITY
DEPARTMENT OF MECHANICAL ENGINEERING

Applications are invited for a NERC RESEARCH ASSISTANTSHIP to assist in the research programme on the tribology of lubricated rolling and sliding contacts. Applicants should hold an honours degree in Mechanical Engineering, Applied Mathematics, Chemistry, Metallurgy or Physics and should be commencing postgraduate research in tribology. Salary will be on a scale £4,402-£5,302 per annum.

Further particulars and application forms may be obtained from Dr. D. Dowson, Department of Mechanical Engineering, P.O. Box 147, Liverpool L69 3BX, to whom completed forms should be returned by 14th May, 1980.

Quote Ref. 407/RT/THES.

THE OPEN UNIVERSITY
FACULTY OF MATHEMATICS

RESEARCH ASSISTANTSHIP

The Open University is seeking a Research Assistant to work with a member of the mathematics faculty in his field of research. The successful candidate will work in one of the following areas:

Graph Theory; Complex Analysis; Applied Differential Equations; Statistics; Problems of outlier methodology and the relevance of robust modelling and estimation for multivariate extreme value theory; History of Mathematics.

His/her duties will also include taking part in general research activities in the faculty. Salary will be on the range £3,402 to £5,302, commencing at the R.A. 1A point, with a probationary first year.

Application forms may be obtained from Mrs. A. Sutherland, Sub-Dean (Administration), Faculty of Mathematics (1810/3), The Open University, Walton Hall, Milton Keynes MK7 6AA, or telephone Milton Keynes 653584. There is a 24-hour answering service on 653584.

The successful candidate will take up the post on October 1, 1980 (or as soon as possible thereafter).

Closing date for applications: May 19.

Colleges of Higher Education

WEST GLAMORGAN County Council

WEST GLAMORGAN INSTITUTE OF HIGHER EDUCATION

Applications are invited for the following posts in the Authority's service to commence as soon as can be arranged.

Head of Mathematics and Computing (Principal Lecturer Grade)

This important and challenging post involves responsibility for the coordination, control and development of courses in Computing and Mathematics. Applicants should have graduate or equivalent professional qualifications, extensive experience in commerce or industry or higher education and the ability to lead and direct an academic team on present and future courses up to B.C.S. Part II level. The salary range for this post is £8,256 p.a.-£9,162 p.a. (bar)-£10,362 p.a. (Post Ref. HE6/5/4/79/THES).

Senior Lecturer in Mathematics (In-Service Training of Teachers)

This important post includes a shared responsibility for the development of present and further Mathematics in-service training courses for teachers. Applicants should have a good honours degree in Mathematics, teaching experience, a teaching qualification and be prepared to teach on Dip.H.E. and B.Ed. courses. Applicants will be expected to provide evidence of a keen interest in the problems of Mathematics teaching in primary or secondary schools. A knowledge and an understanding of contemporary teaching approaches relevant to the "middle school" would be an advantage. The salary range for this post is £7,092 p.a.-£8,280 p.a. (bar)-£8,871 p.a. (Post Ref. HE6/79/THES).

Head of Electronics and Science (Principal Lecturer Grade)

This key post involves responsibility for the coordination, control and development of courses in Micro-Electronics, Systems Control, Instrumentation and Science. Applicants should have graduate or post-graduate qualifications, wide experience in industry or teaching and the ability to bring leadership and direction to existing and new courses in Micro-Electronics and related fields. The salary range for this post is £8,256 p.a. £9,162 p.a. (bar)-£10,362 p.a. (Post Ref. HE6/6/4/79/THES).

Lecturer II in Electronic Engineering

Applicants for this post should be graduates possessing teaching and research and/or industrial experience in Micro-Electronics. The person appointed will have a sound knowledge of microprocessor-based systems and experience in process control and instrumentation systems. The salary range for this post is £4,806 p.a. £7,686 p.a. (Post Ref. HE6/8/4/79/THES).

Head of Automobile and Transport Engineering (Principal Lecturer Grade)

The person appointed will be responsible for the organization, management and development of courses in Automobile and Transport Engineering and will be fully conversant with the current developments of courses at craft, technician, higher technician and professional level and will have an intimate knowledge of the industry and training schemes run in conjunction with the R.T.I.T.B. Applicants should hold relevant academic qualifications, be members of the appropriate professional institutions and offer proven teaching and industrial experience together with the ability to bring leadership and direction to the present and future courses in this area. Salary range £8,256 p.a.-£9,162 p.a. (bar)-£10,302 p.a. (Post Ref. HE7/4/4/79/THES).

Head of Industrial and Plant Engineering (Principal Lecturer Grade)

The person appointed will be responsible for the organization, management and development of courses in industrial and plant engineering and associated developing subject areas of safety and reliability engineering, energy management and welding technology up to H.T.E.C. and degree level. Applicants should be graduates or have equivalent professional qualifications and preferably a higher degree with proven teaching and industrial experience, together with the ability to bring leadership and direction to the present and future courses in this area. The salary range for this post is £8,256 p.a.-£9,162 p.a. (bar)-£10,362 p.a. (Post Ref. HE7/5/4/79/THES).

Lecturer II in Mechanical and Manufacturing Engineering (Two posts)

Applicants are expected to offer expertise in either (a) Manufacturing Technology or (b) Instrumentation and Control, with a bias to manufacturing engineering applications and to contribute in the teaching of associated subject areas including manufacturing systems, reliability engineering, thermal and fluid power and microprocessor applications. Participation in curriculum development, project and design teaching on a range of courses from T.E.C. Certificate/Diploma to H.T.E.C. and degree level will be encouraged. Applicants should possess graduate or equivalent professional qualifications, preferably with recent experience in industry. Teaching experience, although desirable, is not essential. The salary range for this post is £4,806 p.a.-£7,686 p.a. (Post Ref. HE7/6/4/79/THES).

Head of Building and Surveying (Principal Lecturer Grade)

The duties of this post will include the coordination, development and academic leadership of work on courses in Building, Surveying and Site Management Studies. Specific teaching duties will be required in Building Technology and Management subjects to professional level. Applicants should have relevant professional qualifications at degree level and have appropriate industrial experience. The salary range for this post is £8,256 p.a.-£9,162 p.a. (bar)-£10,362 p.a. (Post Ref. HE/A/THES).

Head of Craft Studies (Construction) (Principal Lecturer Grade)

The duties of this post will include the coordination, development and academic leadership of the work undertaken in the three main areas of Wood Trades, Trowel Trades and Painting and Decorating. Applicants should possess good professional qualifications and should have had teaching and administrative experience in a major craft discipline. The salary range for this post is £8,256 p.a.-£9,162 p.a. (bar)-£10,362 p.a. (Post Ref. HE3/4/4/79/THES).

Lecturer II in Mechanical Services

To teach in the general area of mechanical services including Plumbing, Heating and Gas Service Engineering. The successful applicant will be responsible for the coordination and development of new sandwich training and block-release courses in the services field. Applicants should possess good craft and technician qualifications and have relevant industrial experience. The salary range for this post is £4,806 p.a.-£7,686 p.a. (Post Ref. HE/B/THES).

Lecturer I in Trowel Trades (Plastering)

To teach theory and practice up to Advanced Craft Certificate level in plasterers' work. Applicants should possess good craft qualifications and have relevant industrial experience. The salary range for this post is £3,768 p.a.-£6,438 p.a. (Post Ref. HE3/5/4/79/THES).

Application forms and further particulars are available from the Principal, West Glamorgan Institute of Higher Education, Townhill Road, Townhill, Swansea SA2 0UT. Please send a stamped addressed foolscap envelope and quote the appropriate post reference number(s).

The CLOSING DATE for the receipt of completed application forms is THURSDAY, 15th MAY, 1980.

John Beale,
Director of Education.

LONDON BIBLE COLLEGE
require a
LECTURER
in
PHILOSOPHY AND CHRISTIAN ETHICS
also a
SENIOR LECTURER
in
OLD TESTAMENT STUDIES

Conservative Evangelicals, with relevant higher degrees and teaching experience are invited to apply to

The Principal, London Bible College
Green Lane, Northwood, Middlesex HA6 2UW
for an application form.

Gwent college of higher education / **coleg addysg uwch Gwent**

LECTURER II IN LAW

Applicants for the above post, tenable from 1 September, must be graduates in Law with a special interest in Company and Commercial Law. A higher degree and/or professional qualification an advantage. Previous teaching experience is desirable but not essential. The successful applicant will be involved in a range of courses, including ACCA, ICMA, HND/HNC Business Studies, External London LLB Degree and Institute of Legal Executives. Salary: £4,806-£7,686. Starting point on the salary scale will depend upon previous commercial and teaching experience.

For further details and application forms apply to: Principal Administrative Officer, Gwent College of Higher Education, College Crescent, Caerleon, Gwent NP6 1XJ. Tel. (0633) 421292.

Applications to be returned within 10 days of the appearance of this advertisement.

Colleges of Higher Education continued

GWENT COLLEGE OF HIGHER EDUCATION

Faculty of Science and Technology

READER IN MICROELECTRONIC/COMPUTING SYSTEMS

to be responsible for establishing a unit to co-ordinate work in the industrial and educational applications of microelectronic systems and computer science. The person appointed will be expected to provide leadership over a wide spectrum of activities relevant to the new technology. In particular applicants should have an interest in educational development and innovation and in industrial and educational research in this field. Support from the DOI Microprocessor Application Project has been received for courses for industry. The College is also involved in the in-service training of teachers and in developing microelectronic/computer studies in Gwent schools.

LECTURER II/SENIOR LECTURER POSTS IN MICROPROCESSOR APPLICATIONS AND COMPUTER TECHNOLOGY

In connection with the Microprocessor Application Project scheme, applications are invited from graduates with recent industrial or research and development experience in the application of microprocessors to industrial systems. The successful applicants must have an active interest in developing educational courses in the above area and develop a close liaison with industry. Appointments will be made from 1st September 1980, at points on the Lecturer II or Senior Lecturer scales according to qualifications and experience.

LECTURER II POSTS IN INSTRUMENTATION AND ELECTRONIC ENGINEERING

Applications are invited from graduates in appropriate disciplines, preferably with recent industrial or research and development experience in Process Control or Microelectronics Applications. Two permanent posts are available and one temporary post tenable for one year. Appointments will be made from 1st September, 1980, at points on the Lecturer II scale according to qualifications and experience.

Salary ranges (under review) :—
Lecturer II : £4,605—£7,686
Senior Lecturer : £7,092—£8,280 (Bar)—£8,871
Reader : £8,255—£9,162 (Bar)—£10,362
Salary on appointment will be below the bar.

Further particulars and application forms, to be returned as soon as possible, are available from :—

Principal Administrative Officer, Gwent College of Higher Education, College Crescent, Caerleon, Gwent NP6 1XJ.
Telephone enquiries may be made to Mr David T. Rees (Dean of Faculty), Newport (0633) 51525.

DORSET INSTITUTE OF HIGHER EDUCATION

Applications are invited for the following posts :—

LII/SL in COMPUTER STUDIES
with particular reference to microcomputer applications in business

LII/SL in ACCOUNTING
for degree and professional courses

LII/SL in ORGANISATIONAL BEHAVIOUR
for business studies degree and diploma courses

LII/SL in LEGAL STUDIES
with special reference to business including tourism and catering

Further details and application form available from the Director, Dorset Institute of Higher Education, Wallisdown Road, Wallisdown, Poole, Dorset, BH12 5BB. Telephone : Bournemouth (0202) 524111.
Closing date : Friday, 16th May, 1980.

Applications are invited for the post of:—

VICE-PRINCIPAL

which will become vacant from 1st January, 1981, upon the retirement of the present holder.

The College is in Group 7, and provides advanced further education in business, management, science and technology.

Salary : £12,855 per annum, (under review), plus £177 fringe London allowance.

Closing date for applications : 16th May, 1980.

Application forms and further details from:—

The Chief Administrative Officer,
Slough College of Higher Education,
Wellington Street, Slough, Berks.
SL1 1YG
(Tel : Slough 34585, Ext. 28).

DORSET INSTITUTE OF HIGHER EDUCATION

Applications are invited for the post of

ASSISTANT DIRECTOR (Wallisdown)

Salary within Vice Principal Group VII

Further details and application form available from

**The Director,
Dorset Institute of Higher Education,
Wallisdown Road,
Wallisdown, Poole, BH12 5BB**

Closing date Friday, 16th May, 1980

LIVERPOOL INSTITUTE OF HIGHER EDUCATION

Christ's/Notre Dame College and St. Katharine's College

A full-time temporary lecturer in

Sociology

is required to teach B.A. and B.Ed. courses as part of a team of three during the acsdemic year 1980/81 owing to the absence of the Head of Department on study leave. The appointment will be tenabe in Christ's/Notre Dame College.
Applicants should have at least a good first degree in Sociology, preferably accompanied by experience in teaching Ordinary level or Advanced level courses. The successful candidate would be expected to teach a wide range of topics. However, World Development is an area of growing importance within the syllabus where specialist interest would be welcome. An interest in research methods would also be an advantage.
Although the appointment will be for one year in the first instance, it is possible that a permanent appointment may become available which would be tenable in either of the two Constituent Colleges of the Institute.
The Salary payable will be in accordance with the current Burnham Scales.
A letter of application should be made before May 19th to : Rector, S. Katharine's College, Stand Park Road, Liverpool, L16 9JD.

DORSET INSTITUTE OF HIGHER EDUCATION

Lecturer II/Senior Lecturer/Principal Lecturer in
(1) FOOD AND BEVERAGE STUDIES
(2) CATERING SCIENCE AND TECHNOLOGY
(3) CATERING ADMINISTRATION

These three key appointments are required in the Department of Tourism, Catering and Hotel Administration for September, 1980.
Application forms and further details are available from : The Director, Dorset Institute of Higher Education, Wallisdown Road, Wallisdown, Poole, Dorset BH12 5BB. Tel : Bournemouth (0202) 524111.
Closing date : Monday, 12th May, 1980.

HAMPSHIRE
SOUTHAMPTON COLLEGE OF HIGHER EDUCATION

Department of Engineering and Applied Science

Principal Lecturer in Mechanical Engineering

required September 1 to lead the mechanical engineering section in developing a degree course in Engineering Manufacture. Ability to teach the mechanics of machines and materials will be an added recommendation. Salary scale £8,256-£10,362 (under review). Application forms and further details may be obtained from the Principal, Southampton College of Higher Education, East Park Terrace, Southampton, SO9 4WW, to whom they should be returned within two weeks of the advertisement appearing.

BEDFORDSHIRE EDUCATION SERVICE
BEDFORD COLLEGE OF HIGHER EDUCATION
SCHOOL OF HUMANITIES

LECTURER I IN ENGLISH required for September 1980. Applications are invited from well qualified English graduates with a first class honours degree and an interest in 17th Century English literature. The successful candidate will be required to teach English classes and one other area appropriate to combining to an English literature course in the CNAA validated BA (Combined Studies) course.
Further details and application form obtainable from the Principal, Bedford College of Higher Education, Kingsland Site, Cauldwell Street, Bedford MK42 9AH.
Completed forms should be returned by May 16, 1980.

CAMBRIDGESHIRE COLLEGE OF ARTS AND TECHNOLOGY

TEMPORARY LECTURER IN TECHNOLOGY

Required from 1 September, 1980, to 31 August, 1981, to teach Technology to degree level and to "A" level and GCE O.U.D.E. students. Heads the degree work will be in the area of technological studies, second year students. Applicants should have an honours degree in sociology and preferably teaching experience.
Salary scale £5,388 to £8,766 (under review) according to qualifications and experience.
Further particulars and application forms may be obtained from Mrs Janet Martin (reference SO/TECH), Student Services Department, Cambridgeshire College of Arts and Technology, Station Road, Cambridge CB1 2JB (telephone 0223 311811 extension 2).
Completed forms should be returned by May 16, 1980.

HEREFORD AND WORCESTER COUNTY COUNCIL
WORCESTER COLLEGE OF HIGHER EDUCATION

LECTURER IN CAREERS EDUCATION

Applications are invited for a post as Lecturer in Careers Education from 1st September, 1980. The appointment will be made at the appropriate point on the Lecturer II Bonus Lecturer Scale currently £4,806 to £8,871.
The person appointed will be required to teach and develop courses in Careers Education for school teaching students and teachers on in-service courses and will have relevant experience together with a first degree, professional qualifications and or a higher degree in addition. The successful applicant will manage the College Careers Service for students who have followed a B.A. (Hons.) programme, or B.Ed or P.G.C.E. programmes in initial teacher training. The Careers Service has recently moved into new premises.
Further details and a form of application may be obtained from the Principal, Worcester College of Higher Education, Henwick Grove, Worcester, WR2 6AJ (0905 422331) to whom completed application forms should be returned within 10 days of the appearance of this advertisement.

Colleges and Institutes of Technology

DUNDEE COLLEGE OF TECHNOLOGY
DEPARTMENT OF ACCOUNTANCY & ECONOMICS

SENIOR LECTURESHIP IN ACCOUNTANCY

Applications are invited from graduates and/or qualified persons with lecturing, industrial, commercial or other relevant experience.
Salary scale : Senior Lectureship (A) (under review)—£8,385-£9,360 (Bar) (BAR)—£10,594, with initial placing dependent upon approved previous experience. Financial assistance towards the cost of removal expenses may be payable.
Further particulars and application form obtainable from the Personnel Officer, Dundee College of Technology, Bell Street, Dundee DD1 1HG, with whom applications should be lodged not later than 9 May, 1980.

DUNDEE COLLEGE OF TECHNOLOGY

SENIOR LECTURESHIP (A) IN ECONOMICS

As a result of promotion a vacancy now exists for Senior Lecturer (A) in Economics in the Department of Accountancy and Economics. Applicants should be Honours Graduates and have academic, research and other relevant experience. The person appointed will be required to provide academic leadership in Economics.
Salary scale: Senior Lectureship (A) (under review) £8,385-£9,360 (Bar to £10,594, with initial placing dependent upon approved previous experience. Financial assistance towards cost of removal expenses may be payable.
Further particulars and application form, obtainable from the Personnel Officer, Dundee College of Technology, Bell Street, Dundee DD1 1HG, with whom application should be lodged not later than 16 May, 1980.

Administration

Social Science Graduates

Applications are invited from young social science graduates for a Scientific Officer post with the Social Science Research Council. The successful candidate will work as part of a team providing the secretariat for the Politics, Law and The Environment Group of Committees and Panels, and will chiefly assist with the work of the Geography and Planning Committees and with research developing new research in the fields of Recreation and Leisure, and Relations between Central and Local Government.
SSRC staff are not themselves engaged in research but provide support for Committees and Panels which assess applications for grants to support research projects being undertaken in Universities, Polytechnics and independent institutions, commission research and decide upon research and postgraduates' training priorities.
Applicants should normally be under 27, have a good honours degree in the Social Sciences and have a genuine interest in research administration. Experience in administration or research would be an added advantage.
The salary scale, which is under review, is £4,371 to £6,268 per annum, including inner London Weighting. Starting salary may be above the minimum depending on class of degree and experience. The hours of duty are 36 per week, excluding lunch hours and the leave entitlement is 20 days plus 10½ public and privilege holidays. The Council has its own non-contributory pension scheme.
Application forms and further details may be obtained from Mrs Janet Martin (reference SO/TIES), SOCIAL SCIENCE RESEARCH COUNCIL, 1 Temple Avenue, London EC4Y 0BD. Telephone 01-353 5252, extension 111. Closing date for applications : May 16.

Personal

IMMEDIATE ADVANCE
£100 to £25,000.
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ADVICE on Naturism/Nudism. Naturist Times, Orpington, BR6 4LZ.

All advertisements are subject to the conditions of acceptance of Times Newspapers Ltd, copies of which are available on request.

Administration continued

Social Scientist or Business Graduate

required by the

Social Science Research Council

A Higher Scientific Officer is required to work as Secretary to the Council's Work Organisation Executive Panel and to other Initiative Panels within the Economic and Industrial Policy Group. The post will also involve assistance to Secretaries of other Group Panels.
Applicants should be under age 30, have a first or second-class honours degree in the Social Sciences and at least two years' post-graduate experience preferably in the areas concerned.
The salary scale, which is under review, is £5,877-£7,517 (including London Weighting). Starting salary may be above the minimum depending on qualifications and experience. The hours of duty are 36 per week, excluding lunch hours and the leave entitlement is 22 days plus 10½ public and privilege holidays. The Council has its own non-contributory pension scheme.
Application forms and further details may be obtained from : Mrs. Vera Blahton (Ref. HSO/THES), SOCIAL SCIENCE RESEARCH COUNCIL, 1 Temple Avenue, London EC4Y 0BD. Telephone 01-353 5252, Ext. 110. Closing date for applications : 16 May.

BIRMINGHAM
THE UNIVERSITY OF ASTON
COLLEGE ADMINISTRATOR

Applications are invited for the post of College Administrator to St. Peter's College in Birmingham.
St Peter's College is situated about three miles from the Aston University Campus and is a self-contained community housing 200 residential students and a number of academic and other groups. While there groups are primarily tenants employed they are also involved in teaching, meaningful consultancy and the provision of short courses and organisation of conferences and so it is expected that the administrator will have a role to play in these activities.
The Administrator will be a member of the administrative staff of the University and will work closely with the Warden of the college in the development of the community.
This is an exciting and challenging post for which relevant experience may be advantageous but is not necessary, and where the main requirements are administrative ability and a flair for organisation.
The appointment will be pensionable and will be made on Administrative Grade 1A, £4,371 to £8,769 per annum.
Application forms and further particulars available from Staffing Department, The University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET. Please quote reference number 5/191/THES.

THE ASSOCIATED EXAMINING BOARD
for the General Certificate of Education
Wellington House, Aldershot, Hampshire GU11 1HQ

The Board invites applications for the following posts :
CHIEF EXAMINER in BUILDING and SOCIAL ADMINISTRATION at ADVANCED LEVEL for the 1981 examination.
Applicants for this post must possess a degree or equivalent qualification and have considerable teaching and examining experience at Advanced level or above in schools and/or further education establishments.
All applications must be received within 14 days of the appearance of this advertisement.
Application forms and further particulars may be obtained by applying in writing to the Secretary-Director, ABEC at the board's offices.

PRESTON
THE POLYTECHNIC

Applications are invited for the post of

PRINCIPAL LECTURER IN LAW

Salary scale (under review) £9,360 to £9,162 (bar) to £10,362.
Application forms and further details, quoting reference number AA/38, from the Personnel Office, Preston Polytechnic, Preston PR1 1TQ. Closing date May 14, 1980.

General Vacancies

RE-ADVERTISEMENT

Field Consultant

Applications are invited for the post of third Field Consultant with the Adult Literacy and Basic Skills Unit, which was established as a special agency of the National Institute of Adult Education from 1 April, 1980.
The Unit will act as a central focus for adult literacy and associated basic skills work in England and Wales and will sponsor training, publish a limited number of books and other aids and offer a consultancy service to providing bodies.
The team of 3 Field Consultants will work from the Unit's London base but will be expected to undertake a substantial amount of travelling throughout England and Wales.
It is essential that applicants for the post should have both interest and experience in numeracy work with adults. Experience and interest in other areas of work within the Unit general remit, including adult literacy, basic skills work with special groups and coping or life skills would also be an advantage.
The successful candidate will work as part of a small staff team led by the Head of Unit.
The commencing salary will be between point 40 (£9,300) and point 47 (£11,010) on the NJC scales (Principal Officer) inclusive of London Allowance per annum.
Further particulars and application forms may be obtained fro mthe Adult Literacy and Basic Skills Unit, 52/54 High Holborn, London WC1V 6RL (Tel : 01-405 4017).
Closing date for applications is 14 days from the appearance of this advertisement.

ALBSU
Adult Literacy & Basic Skills Unit

COUNCIL FOR THE EDUCATION AND TRAINING OF HEALTH VISITORS

DIRECTOR

The Council invites applications for the post of Director which will become vacant in August, 1980.
Applicants must be qualified Health Visitors with additional teaching and/or educational qualifications and extensive professional experience.
The salary scale, which is that of Grade AT2 in the National Health Service, is £12,010 to £15,631, currently under review. Additionally London Weighting of £726 is payable.
Under the terms of the Nurses, Midwives and Health Visitors' Act, 1979, the personal position of the Director, as is the case with the staff of all existing bodies, is safeguarded. This is elaborated in the further particulars of the post which, together with application forms, which must be returned by May 16, 1980, may be obtained from:
J. Musgrave, Senior Administrative and Finance Officer, Council for the Education and Training of Health Visitors, Clifton House, Euston Road, London NW1 2RS ; telephone 01-387 3456, extension 54.
This is a readvertisement.

Technical Editor
Focal Press

Focal Press is looking for a technical editor to manage a section of its extensive list of photographic and other audio-visual communication books.
Working as one of a small team, the technical editor will be responsible for originating, shaping and coordinating a publishing programme. He/she will need the interest and commitment to ensure the quality and accuracy of the technical content of the books
The successful applicant will have a science/technology background. A personal interest in photography or audio-visual media would be distinct advantage.
If you feel that you can meet the challenge of this unusual and demanding job, please telephone Lisa Courtney on 01-387 0711 for an application form.

Colleges of Education

NORWICH
Keswick Hall
College of Education

TEMPORARY LECTURER

(part-time) in the theory and practice of ART EDUCATION required from September, 1980, for one year only. The appointment will be on the Lecturer II/Senior Lecturer grade. Candidates should be practising artists and hold an Art Teacher's Diploma or equivalent qualification. Experience of the teaching of Art in schools, preferably within the age range of 5-12 is necessary.
The person appointed will be required to contribute to courses for First and Middle School teaching for 2½-3 days each week during College terms.
Further details and application forms from the Principal's Secretary, Keswick Hall College of Education, Norwich, Norfolk NR4 6TL.

Colleges of Further Education

MERTON
London Borough of
WIMBLEDON SCHOOL OF ART

Suitably qualified person required for the post of SENIOR LECTURER in GRAPHICS to head the Fine Art Department, which becomes vacant on 1st September, 1980. The Department offers a specialist course in Fine Art (Painting) leading to a CNAA (Painting) Bachelors degree course.
Salary is in accordance with current Burnham Regulations for a Senior Lecturer, £8,256-£8,763 (under review) plus £177 per annum under London Allowance.
Further particulars and application forms (to be returned within 3 weeks of the appearance of this advertisement) may be obtained from the Registrar, Wimbledon School of Art, Merton Hall Road, London, SW19 3QA.

Colleges of Further Education

LONDON
INNER LONDON EDUCATION AUTHORITY
ST. MARTIN'S SCHOOL OF ART
107 Charing Cross Road, London WC2H 0DU

Appointments to the following posts will be made from September, 1980.
Head of PAINTING DEPARTMENT (Grade IV).
Applicants should be practising artists with appropriate qualifications and experience.
Salary £9,308-£10,431 (plus £600 Inner London Allowance) subject to formal approval.
SENIOR LECTURER in GRAPHIC DESIGN.
Applicants should be illustrative graphic designers who are capable of creative thinking and designing for a wide range of visual communication problems.
Salary £7,092-£8,871 (plus £600 Inner London Allowance) subject to formal approval.
Further particulars and within 21 days, are available from the Secretary of the School. Please state which post is of interest.

WEST SUSSEX
INSTITUTE OF HIGHER EDUCATION
(Incorporating Bishop Otter College, Chichester and Bognor Regis College)

Required for 1st September 1980

LECTURER II/SL in EDUCATION with a background in Applied Psychology to participate in courses of initial and in-service teacher training and research in the field of Education in U.K. courses.
Applicants should be able, as an organisation from the perspective of sociology, occupational or environmental psychology, would be expected for contribute for this post.
Applicants should be familiar to the Director, West Sussex Institute of Higher Education, The Bishop Otter Building, Bognor Regis, West Sussex PO21 1HR stating full curriculum vitae, giving reason for applying for this post and the names and addresses of three referees. Closing date within 21 days of the appearance of this advertisement. Full application pack available by phone 0243 860381.

For Sale and Wanted

MARIAN RAY Ringtone. B.A.E. for hire.—5 Hillfrere Avenue, Surbiton, Surrey.

Overseas

CAULFIELD INSTITUTE OF TECHNOLOGY
MELBOURNE, AUSTRALIA

Deputy Director (Advanced Education)

(Ref: 80/34)
The Caulfield Institute of Technology is a multi-level and multi-discipline post-secondary institution affiliated with the Victoria Institute of Colleges, and incorporated in the Victorian Technical Education system. It is one of the three major polytechnics in Victoria and a member of the Australia-wide Organisation of Central Institutes of Technology.
The Institute offers a wide range of courses in advanced education as well as in technical and further education. CIT also meets part of the community's need for continuing education by a wide range of short courses on specialised topics.
The present full and part-time student enrolment of CIT is approximately 9,000 of whom about two-thirds are enrolled in advanced education and one-third in technical and further education.
Applications are invited for the position of Deputy Director (Advanced Education). The appointee will be involved in all Council matters relating to advanced education and will need to be able to work within the multi-level structure of the Institute and to promote the corporate identity of CIT. The Deputy Director (Advanced Education) will be responsible to the Director for a wide range of external and internal advanced education functions.
Appointment will be on either a fixed-term or tenured basis; the decision will be made at the time of any recommendation for appointment.
Salary: $A37,330 p.a.
Intending applicants should first contact the Staff Officer from whom copies of the position specification are available.
Written applications quoting the reference number, and including personal and career details and the names and addresses of two referees, should be addressed to the Staff Officer to reach him by 30 June 1980.

Caulfield Institute of Technology,
900 Dandenong Road, Caulfield East,
Victoria, 3145, Australia.
3328

UNIVERSITY OF NATAL
DEPARTMENT OF COMPUTER SCIENCE
DURBAN AND PIETERMARITZBURG

Applications are invited from suitably qualified persons, regardless of sex, religion, race, colour or national origin for appointments to the posts of :

SENIOR LECTURER (2 POSTS) IN DURBAN
LECTURER IN PIETERMARITZBURG

Applicants for a Senior Lectureship should have a Ph.D. and for a Lectureship a masters degree in Computer Science or equivalent. Candidates must be strongly committed to research, teaching and curriculum development. Research interests may include business applications of computers, information systems, computer architecture, operating systems or numerical mathematics. Applicants having other research interests will, however, also be considered.
The Department has a number of minicomputer systems in its Computing Laboratory. The University's Computer Centre operates a Univac 1100/10 with terminals in Durban and Pietermaritzburg.
Overseas applicants are initially appointed on a two year contract basis.
Application forms, further particulars of the posts and information on pension, medical aid, group insurance, staff bursary, housing loan and subsidy schemes, long leave conditions and travelling expenses on first appointment are obtainable from the Registrar, University of Natal, King George V Avenue, Durban, 4001 South Africa, with whom applications, on the prescribed form, must be lodged not later than 31 May, 1980, quoting reference Adv.D45/80.

UNIVERSITY OF CAPE TOWN

Lecturer in Geology

Applications are invited for the above post vacant as from 1st January, 1981. Appointment will be made, according to qualifications and experience, on the salary scale R6 100 x R400-R6 900 x R500-R13 200.
The successful applicant will be required to teach undergraduate courses in mineralogy and igneous petrology and to supervise post-graduate research in these fields. Participation in the teaching of graduate courses in mineralogy and igneous petrology may from time-to-time be required. Applicants should have a sound knowledge of these subdisciplines.
Applicants should submit a curriculum vitae, stating present salary, research interests and publications, when available U. appointee, and the names and addresses of three referees.
Further information should be obtained from the Registrar, University of Cape Town, Private Bag X, Rondebosch 7700, by whom applications must be received not later than July 21st, 1980.

Overseas continued

HONGKONG POLYTECHNIC

The Hong Kong Polytechnic is a large institution of advanced education which offers courses in a wide range of subjects. In addition to three major academic divisions comprising 20 teaching departments, it also has a number of inter-disciplinary institutes and centres. It is now preparing plans emphasizing high level programmes and applied research activity relevant to the needs of Hong Kong.

The Polytechnic invites applications for the following posts which are tenable from 1st September, 1980:

DEPARTMENT OF BUSINESS & MANAGEMENT STUDIES

Senior Lecturers/Lecturers in Insurance, Banking, Law and Transport Operations.

DEPARTMENT OF BUILDING & SURVEYING

Senior Lecturers/Lecturers in Quantity Surveying, Building Services, Building Technology/Management.

DEPARTMENT OF DESIGN

Senior Lecturers/Lecturers in Product Design, Fashion Design and Textile Design (Knitwear).

General Qualifications for Appointment

Senior Lecturer: (a) a degree or professional qualifications, plus preferably an advanced specialist qualification ;and (b) at least five years' professional experience: and (c) substantial teaching and/or industrial/commercial experience (about 3 additional years); and (d) proven administrative ability.

Lecturer: (a) a degree or professional qualifications or at least a Higher Technician qualification in the appropriate field of study; and (b) at least five years' professional or industrial/commercial experience or at least three years' teaching experience ,or a suitable combination of professional and teaching experience.

Salary Scales

Senior Lecturer: HK$91,800 to HK$120,000 p.a. by 6 increments.

Lecturer: HK$51,000 to HK$88,800 p.a. by 11 increments.

Note: £1 equals HK$11.09 on 25th April 1980 (The exchange rate is subject to fluctuation).

Conditions of Service

Appointment will be on two-year gratuity-bearing contract terms initially. Thereafter suitable appointees may be offered further contracts or superannuable terms of service at the discretion of the Polytechnic. Benefits include long leave; free passages; subsidized accommodation; medical and dental treatment; children's education allowance; and a terminal gratuity equal to 25 per cent of basic salary received over *entire* contract period.

Application forms and further information are obtainable from the Hong Kong Government Office, 6 Grafton Street, London W1X 3LB, U.K. Completed application forms should be returned to the same office by 20th May, 1980.

UNIVERSITY OF CAPE TOWN

Applications are invited for the following posts, for appointment from 1st January, 1981, or as soon as possible thereafter :—

PROFESSOR IN ELECTRICAL ENGINEERING

The incumbent will be the second professor in the Department, but must be prepared to head the Department if required to do so. The successful candidate will be required to teach and conduct research at under- and post-graduate levels. Specialization in one or more of the following Electrical Engineering fields will be a recommendation : Electronic circuits and systems ; digital techniques and computers ; electronic instrumentation and control , microwaves and antennas.

PROFESSOR/ASSOCIATE PROFESSOR IN PSYCHOLOGY

The University expects to appoint a specialist in one or more fields of Allied Psychology, such as Clinical, Counselling, or Industrial Psychology, but candidates with other fields of specialisation will also be considered. South African applicants should be registered as psychologists with the South African Medical and Dental Council. Applicants should state whether they wish to be considered for one of both levels of appointment.

GENERAL :

1. Applicants for either post should submit a curriculum vitae, stating research interests and publications, when available if appointed, present salary, and the names and addresses of three referees.

2. Appointment will be made according to qualifications and experience, on the following scales :

PROFESSOR : R16,000 x 600-18,000 p.a.

ASSOCIATE PROFESSOR: R10,000 x 600-16,800 p.a.

(Revision of these salary scales is pending.)

Further information should be obtained from the Registrar, Room 19, University of Cape Town, Private Bag X, Rondebosch 7700, South Africa, by whom applications must be received not later than 9th June, 1980 (late applications may be accepted).

The University's policy is not to discriminate in the appointment of staff or the admission of students on the grounds of sex, race, religion or colour. Further information on the implementation of this policy is obtainable from the Registrar.

UNIVERSITY OF NATAL
DEPARTMENT OF AFRICAN STUDIES
DURBAN

Applications are invited from suitably qualified persons, regardless of sex, religion, race, colour or national origin for appointment to the post of :

SENIOR LECTURER/LECTURER in Comparative African Government and Administration

Salary in the range :
SENIOR LECTURER: R11 400-R15 600 per annum
LECTURER: R8 100 -R11 200 per annum

An announcement on an increase in salaries with effect from 1st April 1980 is expected in the near future.

The commencing salary notch will be dependent on the qualifications and/or experience of the successful applicant. In addition, an annual vacation savings bonus is payable, subject to Treasury regulations.

Application forms, further particulars of the post and information on pension, medical aid, group assurance, staff bursary, housing loan and subsidy schemes, long leave conditions, and travelling expenses on first appointment are obtainable from the Registrar, University of Natal, King George V Avenue, Durban, with whom applications, on the prescribed form, must be lodged not later than 16th June 1980 quoting the reference Adv. 43/30.

UNIVERSITY OF CAPE TOWN

RESEARCH FELLOWSHIPS

The University of Cape Town invites applications for Post-Doctoral Fellowships to be held at the University of Cape Town.

The Fellowships are tenable for 12 months and the stipend attached to the Fellowship is R12,000. Successful candidates from abroad will receive an additional travel grant of R1,500. There is no restriction to any particular field of research.

Applications must include full details of the applicant's research programme in addition to a full curriculum vitae and the names of two referees to whom the University may refer. The policy of the University is not to discriminate in the appointment of staff on the grounds of sex, religion, race, colour or national origin. The dates at which the successful candidates will be expected to take up their duties are flexible and can be arranged to suit the special circumstances of the candidate.

Closing date for the receipt of applications is 30th May, 1980.

Applications should be addressed to the Chief Administrative Officer, Research Administration, University of Cape Town, Private Bag, Rondebosch 7700, South Africa.

THE UNIVERSITY OF WESTERN ONTARIO
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS

Applications are invited for an appointment at the rank of Assistant or Associate Professor in the Department of Mathematics. Preference will be given to applicants actively engaged in research in algebraic topology. Salary and rank will depend upon qualifications and experience. The appointment, which is subject to the availability of funds, will commence July 1, 1980. Applications should be sent to :

Dr. F. P. A. Cass, Acting Head, Department of Mathematics, The University of Western Ontario, London, Ontario, Canada N6A 5B9

CANADA

DEPARTMENT OF GERMANIC LANGUAGES

UNIVERSITY OF ALBERTA
Edmonton, Alberta, Canada T6G 2E6

Invites inquiries regarding programmes with ASSISTANTSHIPS leading to M.A. and Ph.D. in literary or philological specializations.

Librarians

ESSEX
COUNTY COUNCIL
COLCHESTER INSTITUTE OF HIGHER EDUCATION
INSTITUTE LIBRARY

ASSISTANT LIBRARIAN, AUDIO-VISUAL SERVICES

The Bibliographic Unit is the focal point for ordering and processing library materials based on the Institute and the Assistant Librarians is in charge of the Unit and the operation of the Institute's Audio-Visual Aids Centre. The successful candidate will be responsible for the maintenance of the Institute's computer orders, and organising the Unit in a different manner and involving more processing by the Library Association will be necessary.

The Library records itself as a central information provider for the Institute and in this role purchases and issues library materials in all formats. Computer information system is also operated.

Salary : APG 04 cost to 6 scale £7,[illegible] per annum.

Applications forms and further details available from the Institute of Higher Education, Victoria Road South, Chelmsford, Essex. Closing date for applications 21st May 1980. Informal enquiries welcomed by the Assistant Librarian, Tel. Chelmsford 353411, Ext. 2[illegible].

Courses

In association with the University of Edinburgh
LOTHIAN REGIONAL COUNCIL
presents
ROBERT LOUIS STEVENSON and VICTORIAN SCOTLAND
10th-14th July, 1980
William Robertson Building, University of Edinburgh, George Square

A major symposium on the life and times of Robert Louis Stevenson. Guest lecturers include David Daiches, Jenni Calder and Christopher Harvie.

Details of the full programme and residential facilities from the Department of Extra-Mural Studies, University of Edinburgh, 11 Buccleuch Place, Edinburgh EH8 9LW. Tel.: 031-667 1011, Ext 6246 or 6060.

SURREY
THE UNIVERSITY
MSc in ENERGY ECONOMICS

Applications and enquiries are invited for a one-year course in Energy Economics (five years part-time) leading to an M.Sc. degree. Applicants should have a good first degree in economics (although combined with a limited formal education in economics but who have a wide involvement in the energy sector may be considered. The course is designed for students interested in the application of economic theory and quantitative techniques to the analysis of energy issues and problems. The programme consists of four compulsory courses covering major topics in economic theory plus other courses with varied emphasis on energy economics as applied to developed and developing countries. The options will include Political Economy of Oil, Oil Pricing, Energy and the Environment, Oil and Economic Development, National and International Operations Research.

For details and application forms apply to the Registrar, Department, University of Surrey, Guildford, Surrey GU2 5XH.

Holidays and Accommodation

ARCHAEOLOGY IN ISRAEL. Digging expeditions. A holiday with a difference. Jerusalem Archaeological Unit, Dept. H.E., Project 67, 33 Jabotinsky Street, Jerusalem, Tel. 02-536 1066.

To Let, three house in pleasant residential district, Amersham/Gerrards Cross, Bucks, from July 23rd (preferably to one family). Maximum 6 people. Reasonable price.—Phone Northchurch 71340.

FOR INFORMATION on subscriptions to the THES please write to the Subscription Manager, The Times Higher Education Supplement, P.O. Box 7, New Printing House Square, Gray's Inn Road, London WC1X 8EZ

TRY THE DUCK IN PEKING

For centuries China has been a distant and mysterious land for even the most intrepid explorers.

Now the Times Educational Supplement in conjunction with Lunn Poly Limited has arranged a 17 day tour of this vast country departing from London on August 3rd 1980.

The itinerary will take in Peking, Shanghai, Canton, Hangzhou and on the way back, Hong Kong. You will have the opportunity during arranged visits to kindergartens, schools and universities to meet Chinese teachers and learn about the Chinese educational system.

There will also be conducted tours of the Forbidden City, The Ming Tombs, Temples, The Great Wall, and of course you can sample the Peking Duck – in Peking!

The price which includes full board accommodation, all flights and excursions and the services of an English speaking guide throughout will be £1,208. For more detailed information about this most exciting trip please complete the coupon below and post it to Group Travel Operation, Lunn Poly Limited, York House, Clarendon Avenue, Leamington Spa, Warwickshire CV32 5PS.

Please send me information about the TES China Tour

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ADDRESS

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Union View

The false economy of training cuts

"They know it—but can they teach it?" This is the basic question that we have chosen as the central theme of our campaign for better standards of teaching in the universities and in particular for a permanent system of lecturer training.

No doubt we have ruffled a few academic feathers, but the signs are that we are beginning to take the lead out from pathetic national committees and review groups and into the lecture theatres and common rooms of university departments.

The reasons for the campaign are fairly obvious. All available evidence suggests that university students are highly dissatisfied with the teaching they receive. A survey of student opinion in the science faculty at Manchester University, which involved almost 3,000 students, revealed that 77 per cent thought that lecturers would benefit from training in teaching methods. A survey at Oxford produced similar findings and challenged the effectiveness of the university's tutorial system. NUS felt that it had a major responsibility to its members to take up the issues and give coherent expression to what all too often remain unspoken frustrations among university students with their courses.

It's not just the students who are frustrated by poor teaching standards either. One of the conclusions in a book recently published *The University Teacher and his World* is that university teachers like teaching and work hard, but do not develop the professional skills which enable them to improve their teaching ability and so end up frustrated. There are plenty of other examples of frustration among academics, especially with a system of promotion which values research output much more than teaching ability.

Most people in the universities say that they would like to see better teaching and some work hard for it on teaching method units or staff development committees, at the risk of being labelled cranks by their colleagues. At a national level, the Coordinating Committee for the Training of University Teachers (CCTUT) works hard on a shoestring budget to encourage the tiny group of people involved in training.

The fact remains that almost alone among teachers in Britain, university lecturers do not have to undergo any training in what ultimately justifies their existence, the basic job of teaching students. The universities themselves have dragged their feet on the issue, providing minimal funds for development of their own staff and for coordination at national level. The CCTUT has recently concluded a review of its own work, whose recommendations are a step forward but nothing like enough, and there's no guarantee the universities will collectively provide the funds to implement them. The temptation is to direct cutbacks in funding towards lecturer training—witness the proposal to close the teaching methods unit at London University.

NUS argues that such cuts will prove a false economy. Lecturer training improves teaching standards, which is good in itself, but also makes it easier to resist general cutbacks in the public funds devoted to universities as institutions of learning. Better taught students mean more popular universities. NUS is not saying that students should be "spoofed", but if lecturers are to remain the central element of degree courses, they have to be more effective.

Ultimately, we want to see a system of compulsory training for all lecturers throughout their careers but in the meantime we want to see the development of existing voluntary provision.

The NUS campaign has drawn up a number of related issues for investigation. Our postgraduate members have expressed real interest in the idea of training for tutoring and demonstrating—programmes being organized at the University of East Anglia provide encouraging models.

The NUS Welfare Unit is examining the role of lecturers as personal student counsellors and possible methods of training. It is encouraging student unions to organize courses in study techniques for first year students—hopefully the universities themselves will assume responsibility when the value of such courses is shown. The campaign has so far focused exclusively on the university sector but NUS is now looking at ways of raising the basic questions of teaching and learning standards in other sectors.

Should it be raising the issues at all when cutbacks are threatening lecturers' jobs, courses and even whole institutions. We think so, if we are to avoid defending a status quo which many students find frustrating and which the public consider ineffective and a system of education which students and the public consider worth defending.

Andy Pearmain

The author is vice-president education-elect of the National Union of Students.

Learning to teach the new technology

Controversy on the implications of technological change, particularly developments in micro-electronics, dominates the media. One view of the "post chip" era advocates greatly increased expenditure on education, especially continuing education, as a means directly to employ those who might otherwise be without work, but more importantly to develop the entrepreneurial and further technological skills necessary to create new jobs in new industries. Whether or not the scale of post-compulsory education is doubled, (as is advocated), our higher educational establishments have some substantial responsibilities in this high technology era.

Leaving aside education aimed at helping people to cope with, compensate for and adjust to technological change, for example, retraining employment, universities and polytechnics have two key roles now and for the foreseeable future. Firstly the development of those who will create, promote, apply, manage, work with and be affected by new technologies, and secondly direct research on and development of new technologies. The first is a part of the traditional teaching role of institutions. It is essential if the United Kingdom is to survive and compete as a high technology country. Colleges must develop both good technologists and others who are able and anxious to contribute to or whose lives are influenced by the processes, consequences and organization of technological change.

How well do our institutions perform this essential task? Can they adequately cope? The fact is they could do better, much better: not because they cannot cope, or do not want to, but largely because they are prevented. There are many notable exceptions but in general the teaching of technology is outstanding : technologists and others, presently suffers because of the adoption of too narrow a view of technology (too great an emphasis on hardware); an insufficiently purposeful approach ; the use of inadequate staff and equipment resources ; too much concentration on teaching, rewarding technologists (and not enough effort for social scientists, business studies students, etc.) and insufficient fervour (resulting in failure to develop enthusiasm and commitment).

The first four points are related. Resources are often inadequate because of the ageing academic faculties resulting from low staff turnover and lack of expansion. Increased work loads permit staff less contact with industry and less time for research. Fewer young staff enter teaching and faculties "get out of touch". Lack of funds prevents the purchase of new equipment at a time when equipment is becoming costlier and more rapidly out of date, hence many laboratories are rapidly approaching chronic obsolescence. These inadequate resources are inevitably concentrated on the education of a narrow range of necessary students over a narrow range of largely traditional topics. Thus nontechnologists tend not to benefit, other staff rarely get involved, little motivation is developed and few people are directly involved have the benefit of experience of technology during higher education.

Taking a protechnology view, what we need is more experiential education, a broader perspective of course, the involvement of more staff and students, more purposes, better resources and more enthusiasm.

Four of these prescriptions concern or relate to the *technological environment* of higher education institutions. This should be a priority action area. The argument is as follows. Firstly we need to develop people's attitudes, to enthusiasm for and skills in technology, as well as simply their knowledge (for example, we need more people who know and *want* to do). Secondly, for this reason we need to provide a stimulating educational process in which individuals develop through experience and accomplishment. We need to develop attitudes, enthusiasm and skills through exposure, contact and the development of a "need to know". These things are contagious hence we need a "hands on" process. This is particularly important as more "invisible" technology develops, since the casual observer cannot see it (a chip) working. Thirdly, to achieve this we must provide, within education, contagious examples of advanced technological application. Institutions must provide stimulating technological environments through from office and library technology to the laboratories and the classroom. Staff and students must live in, contribute to, develop and get to know such an environment if the educational process is to be anything other than a detached, unreal experience.

How is this to be achieved? How do we transform the technology environment of many of our colleges. A doubling of our expenditure on education would help, since most of the present constraints are economic! But what of the short term?

Closer collaboration between institutions will be necessary if adequate equipment is to be obtained and fully utilized. There is possibly a need for regional laboratories for certain types of work in some areas. Closer links with industry would also help, since the best equipment is to be found in progressive companies. More teaching on company premises and the temporary exchange of staff would help. Colleges and universities should be encouraged to set up science/industry parks on campuses (the present "rules" discourage this). Small, high technology, entrepreneurial companies adjacent to institutions could make better resources available for education as well as providing a focus, example and stimulus. The Government should designate every campus a special development area, or preferably a "Free Enterprise Zone" for this reason. Colleges should set up "shadow faculties" of external part-time teaching staff to work alongside (shadow) internal full-time staff. Institutions should work more closely with Government and industry laboratories, to the extent of running some parts of some courses in such labs.

There could be less separation between courses. Why educate chartered engineers entirely separately from engineering technicians, if in practice both must work together, using the same technology? Similarly, must computer scientists be totally separated from electronics technicians, DP and systems personnel, etc. in the educational process?

Coupled with the constraints identified above such practices in institutions are unlikely to facilitate the development of the technological knowledge, skills enthusiasm, commitment and motivation of a greater portion of all students. Without this our educational system will partially fail in its social, vocational and intellectual purposes.

Ray Wild

The author is director of graduate studies and head of the department of engineering and management systems at Brunel University.

Don's diary

Sunday

"Sherry, white wine . . ."—Excuse me, there's a knock at the door.—Hello, Peter . . ."

"Hello. Sorry our two conferences clashed yesterday."

"Come in . . . Professor Peter Kelly, Head of Department—Professor Norbert Petersen, from the Padagogische Hochschule Reutlingen . . ."

"Hello. We are pleased you could help launch the Centre for International Studies in Education. How did it go?"

"Very well . . ."

"Norbert spoke on children of immigrant workers in Baden-Württemberg and I on Hesse—mainly data collected while at Frankfurt University last year."

"Are there parallels with Britain?"

"Oh yes: social and educational disadvantages, cultural differences. . . . But, of course, in Germany it's mainly a European migration.—Not a temporary phenomenon, though, as originally thought."

Monday

Popped into the university first thing. Correspondence. Memos. Then took Norbert to Mount Pleasant Middle School in the city centre. An attractive Victorian red brick building with a bell tower, on which the legend "Mount Pleasant Board School. Infants". Now an 8-12 school of almost 100 per cent non-native British, the majority being Asian. The head was very welcoming and the children were fascinated with us.

Next we visited the not distant Deanery Comprehensive School. It has over 50 per cent ethnic minority children, largely Asian. Saw two Vietnamese "boat people" in a special English class. Norbert was very taken with everything he saw.

In the afternoon we visited Mount Pleasant First School, near the Middle School. The Asian Head showed us around. They do not find the open plan architecture suitable for their almost totally non-English roll. The children are mainly privacy-loving Asians.

We also looked in on the Southampton Community Relations Council. It does important work for community relations in typically substandard accommodation at the other end of the same terraced road.

Tuesday

Research methods class with full-time MA students. Then spent over an hour discussing a term paper with an MA student. Does everyone spend as much time on individual tutorials/supervision with MA students? I often wonder whether and how others manage to keep such sessions brief.

Memos, correspondence. Lunch in the SCR. Faculty Board Meeting.

Interview two applicants for my E R. & I. course next year (MA in Educational Research and Innovation). One very good, the other satisfactory. Have now made 12 offers (for 12 places)—but how many will have the financial support to be able to take up the offer? Not a single home student on the current course is on secondment. And how will the massive, short-sighted fee increase affect overseas applications? The last two or so of the UCET overseas sub-committee meetings I have attended have, not surprisingly, been preoccupied with this problem.

In the evening do some preparation for my E. R. & I. class first thing tomorrow morning.

Wednesday

My present E. R. & I. group is a good one. Very mixed and experienced (home and overseas students, adult educators and heads, classroom teachers and F.E. lecturers. . . .). The dynamics are excellent and the discussions always lively, whether we are dealing with theories and models of innovation, questions of diffusion, alternative methodologies in evaluation. We usually transcend our cramped accommodation in one of the three-bedroom semis on University Road bought by the university for demolition a few years ago in the heady days of building programmes.

More memos and correspondence. Virtually every time I go past my pigeon-hole there is more paper in it. This time minutes of the last departmental board meeting and papers for the higher degrees subcommittee meeting next week. Some good-looking PhD applicants in this batch. A quick sandwich and cup of tea in my room while going through these. Apologies to social science faculty board meeting. (I'm our faculty representative.)—The recurrent question: How to reduce the number of "don-hours" sunk in government by committee, freeing this time for more productive, scholarly pursuits? Could a greater role be given to elected, accountable representatives who have real power, but serve for a limited term?

Thursday

More correspondence and more memos—almost a full-time job by themselves. When last have I browsed in the library—or even read the *THES*?—I *do* have some library books sitting hopefully on one of my shelves.

Off to the Isle of Wight on the noon hovercraft. (I mark one term paper during the half-hour wait and crossing). The department's new in-service part-time MA just for Isle of Wight teachers and related professionals is working nicely, though it does take up virtually a whole day every week for the tutors concerned because of the crossings (and that is not counting preparation and marking papers). An excellent group, and beginning to develop some promising school-based work.

Missed the Thursday afternoon education seminar again. And when will I get back to making the final alterations to my manuscript on *Writing Research Reports* for Mick Youngman's Rediguides at Nottingham University?

Friday

More memos, more correspondence. One welcome letter is from the teachers who will be guest speakers at my INSET day conference on "Multi-cultural Education for All" on June 7. It is the season, too, for MA dissertations: another one landed on my desk today.

Another long session with the MPhil student from Portugal. There are really such big cultural differences: the broad, grand ideas approach as against the specific, focused, more positivist Anglo-Saxon way.

I am glad to have got those minutes of the last meeting of the centre finally out of the way. Also went through future programme. Plans for the study-day, May 17, on education in Tanzania being organized in conjunction with the department of adult education seem to be coming along nicely.

Went to meet a professor from the University of Toulouse at the station and lunched with him and a colleague in the SCR. He is only passing through now, but I hope we can arrange for him to spend some time perhaps in October.

Saturday

My wife got in last night. Since she is a lecturer at another university we only see each other on weekends. Problem of finding two suitable university posts in the same place. She is working upstairs on a seminar paper. I am in the dining room/study, finally back at the manuscript on "Writing Research Reports"—and this piece for the Don's Diary.

I had better mark some more of those B R & I and part-time MA term papers tomorrow. Over 20 are now sitting on one of my shelves, and the students will be wondering what I am doing with my time.

Peter Figueroa

The author is a lecturer in the department of education, University of Southampton.

LETTERS TO THE EDITOR

Political parallel between Prague and Malta

Sir,—The parallels between Prague and Malta are rather more substantial than your editorial would lead one to believe and are underpinned by an actual link between the two places. The Prague government is in fact propping up Mr Mintoff's university by supplying doctors and engineers to take the place of dismissed Maltese academics, and by extending facilities for post-graduate training of Maltese doctors.

Your distinction between the Maltese and Czech governments is formally correct but of little practical value. Like the South African case, Mr Mintoff's government is West European in letter and East European in spirit. It had a three-seat majority in a 65-seat house and no clear policy on tertiary education at the last election. Its legislation tends to have a marked "discretionary" content, which allows arbitrary ministerial action. Its visible repressive apparatus is limited, but then it hardly needs one, for in a small, closed country repression can be applied invisibly with great effect. *The police are benign to a* fault, particularly with those political thugs who commit arson and beat up people under the police's eyes and are never identified or arrested. One visiting Australian academic did try to foster free discussion and inquiry by writing a book on the recent performance of the Maltese economy. He was subjected to much personal criticism by government economists and he and his family were physically harassed by unidentified persons for several months. The climate on Malta has turned authoritarian. Those who, like the sacked Rector Professor Borg Costanzi, are resisting the proposed changes, are acting as radically as Dr Kenny in Prague.

No doubt, the contours of the university required by Malta's development needs were not identical with those of the University of Malta, but there is no evidence that they were so different as to warrant wholesale destruction. Mr Mintoff does not distinguish between state and government—so much so that he regularly labels criticism of the government in parliament as disloyalty to the state. Mr Mintoff's university reforms have consisted in equating precisely what the state allows with what the government says it can afford, which is why he has shown interest not in some control, but in total and detailed control.

The latest Education Bill provides for control of finance, statutes and regulations, appointments, academic content of courses and research areas, student admission and even the awarding of scholarships by groups of government appointees outside the university. Under the various hats of "prime minister" "employer" (40 per cent of total work force), and "trade union" (the largest trade union is merged with the Malta Labour Party), the government will pack the university council with its people, who in Malta simply act as their master's voice. It will be not a question of incorporating "into the traditional idea of the university a higher priority for national economic development and social equality". What has been created is a university which has economic development and social equality as its sole *stated* purposes. To suggest that such a body fits into the Maltese cultural and economic landscape and should therefore be acceptable to the international university community is to succumb to both the arrogance and the despair you warn against.

Yet the institution seems unlikely to realize even its stated purposes. Any contribution to development will be greatly weakened by the dispersion of staff, the destruction of outside contacts, the working conditions, and the nature of the only product: the narrow nonspecialist. The purely academic requirements for entry have remained the same, so that real workers will hardly get a look in and social inequalities will persist. Sponsorship, which provides ample scope for patronage, will be heavily restricted to young men, because lack of jobs excuses discrimination against married women. A woman graduate who wants to marry before her obligation to five years' service is ended may be told to leave her job and to pay a fine determined by the ministers of education and of finance. Can anyone suggest a better way of producing a higher education system "dominated by young privileged academically-oriented males"?

It is one of the hallmarks of a political life not subordinated to a rigid ideology that aims are to some extent judged by means and results. The long harassment of academic staff and students and the obvious police connivance at it, the destruction of human resources, the feckless planning, all indicate the sympathy that should be extended to Mr Mintoff's aims. When his government stopped the teaching of philosophy at the university, few British academics were to be found "upholding free inquiry and discussion". Like the Prague of 1938, Malta seems to have become a far country.

Yours faithfully,
E. A. MALLIA,
83 New High Street, Headington, Oxford.

Salary Supplement

Sir,—We wish to request the courtesy of your columns to air a number of issues concerning the present administration of British educational aid to higher education overseas.

For some years now one of the major forms of such aid has been the British Expatriate Salary Supplementation Scheme (BESS), by which British lecturers in certain disciplines qualified for financial support in addition to their local salaries. At its inception the scheme was a comprehensive one, but in recent years it has been deemed necessary to restrict awards to those lecturers who occupy senior appointments or whose disciplines are judged to contribute to the national economic development of the particular country concerned.

We want to note that from our experience in this university the administration of the BESS programme has been fraught with the most glaring inconsistencies. Why, for example, should the supplement be awarded to a lecturer in mathematics in the faculty of engineering and denied to a lecturer in mathematics in the faculty of education? Why should some lecturers have had the supplement renewed for a final year of grace, when incoming lecturers in the same discipline have been denied it, given that awards are made on a yearly basis? Or, to speak of our own discipline, why should the supplement be offered to teachers of English language and denied to teachers of English literature?

This latter distinction seems to us quite grotesque, for, quite apart from the fallacious reasoning involved, classroom experience confirms time and time again the utility of library materials in a programme of language competence. As a focus for the consolidation of basic skills (reading, writing and discussion) literature, chosen sensibly and with an eye to cultural differences, is of unparalleled efficacy. And yet, thanks to the policies of the Overseas Development Administration, specialists in language studies, armed often with only a single year diploma in the Teaching of English as a Foreign Language, are now being rewarded far more abundantly than the teacher of literature for work which the latter performs as a matter of course (and which, for reasons of sensibility and training, he or she is usually better equipped to carry out).

However, such anomalies seem to us far less serious in implication than a policy that has effectively denied supplementation to almost all lecturers in the humanities apart from those who have the good fortune to teach English language or linguistics. It is here that the essential shallowness of the concept of "economic" development reveals itself. It is surely axiomatic that economic advance in a developing country can only take place in a particular climate of ideas, values, and social attitudes. Hence the potential contribution of all those specialists whose disciplines allow them to prompt fundamental questions about the very nature of development itself. Teachers in such areas, however, equipped as they are to make contributions towards the true growth of a developing country are at present being discouraged from service overseas by current government policy.

Perhaps, in the wake of the Brandt report on the inseparably linked interests of North and South, it is time for a review of this whole area of policy. It is our belief that such a review must pragmatic appraisal of the mutuality of British and Third World interests will recognise that it is not a contraction of British educational aid that is required here, but an expansion. It is to be hoped that any new programme will be both more enlightened and more consistently applied than has been the case in the past.

Yours sincerely,
DR ANGUS P. COLLINS and
DR SEAN MOLLOY,
Department of English, University of Khartoum, Sudan.

Russian studies

Sir,—Your issue of April 25 contains a totally inaccurate heading and statement to the effect that the University of Strathclyde is contested at a decision reported as made by the University of Glasgow over Russian studies.

The strong reaction expressed by the University of Strathclyde was directed at the Atkinson Report to the UGC, and was formulated, agreed, and dispatched to the UGC, before the University of Strathclyde was aware of any rejection from the University of Glasgow.

The two universities have exchanged responses and respect each other's attitudes. Fortunately their normal cordial relations are strong enough to withstand controversial *comment from third parties or misinterpretation from the press.*

Yours faithfully,
DAVID MORRELL,
Registrar, University of Strathclyde.

Luria's work

Sir,—You published on April 11 a review of an autobiographical sketch by A. R. Luria, "the brilliant Soviet psychologist who died three years ago", outlining his *working life against the background* of the development of psychology in the Soviet Union.

The piece, extending to four columns, stuck to this slight text as if the writer knew nothing else of the man or his work, least of all the most recent, making no reference to the judgment of experimental psychologists who do. It ended with the preposterous proposition that this eminent neuropsychologist, whose work has also had a telling influence on educationists in many countries and is now attracting the notice of anthropologists and historians, is best classified with Bard, "naive" analyst of the "wild boy" of Aveyron, who failed to make the grade in scientific terms.

Precisely because he was a scientist, according to Jerome Bruner he combined "the clinical wisdom of the fine physician with the theoretical acumen of the scientific psychologist", talents which it may be hoped will "be more widely spread among us in the future". Luria did not blow his own trumpet. "A life lived in the context of scientific search is, after all, very short", he wrote in what he called his "necrology", but "while people come and go the solid work remains".

In the last years of his life, suffering from serious heart trouble, he worked intensively at two levels. First to complete a programme of writing up notes dating from the 1920s and 1930s. Examples are the two little case histories written up with such clarity that the general reader could appreciate them, published as Penguin paperbacks 1968-72, which your reviewer supposes to be Luria's best known work and are the only publications he names. Second, to finish revision and composition of such substantial studies as *The Working Brain* (1973) and *Basic Problems of Neurolinguistics* (1976) although your reviewer suggests that Luria failed to broach the problem of bringing the concepts of neuropsychology into relation with new developments in linguistics and psycholinguistics.

In the middle of all this he still found time to send material on teaching reading and writing to children for a projected book for student teachers. After all, it was here that the little book by which he is most widely known was first published, *Speech and the Development of Mental Processes in the Child* (1959), an elegant twin study introducing what were then quite new ideas about the central importance of language, as Oliver Zangwill underlined in his introduction, opening up "a field of the highest interest and importance".

This book has long been circulating in Danish, Dutch, German, French, Spanish, leave aside the Penguin paperback issued in 1970 with a preface indicating how important it has been to educationists and teachers in this country. In saying that Luria's work "has not had a deep impact" your reviewer may be speaking for a department of the British psychological establishment, but certainly not for the world at large.

JOAN SIMON,
11 Pendene Road, Leicester.

Postgraduate research

Sir,—I hope Mr Michael Posner will not allow the Public Accounts Committee to assume that the proposition of social science post-graduates obtaining a PhD within six years of registration is any indication of the value of the work done during two or three years on a SSRC research guidenship.

Much fundamental, critical and innovative research work and scholarship in the social sciences is carried out or initiated by postgraduate students whose research in many cases has provided a theoretical, methodological and substantive underpinning of later work. The requirements, nature and context of postgraduate research in the social sciences differ significantly from those in the pure and applied sciences where doctorates are usually obtained over a shorter period.

We should not be defensive about the fact that in the UK, like the US, it takes on average about nine years to obtain a PhD in some subjects. Nor should we be too worried that over a six year period 16 per cent of those originally registered have not maintained their registration—a withdrawal rate of less than 3 per cent a year. On the contrary, Mr Posner should make it clear that the current strength and influence of the social sciences in Britain rest at least in part on the policy of the SSRC of giving high priority to the support of postgraduate education in the past 15 years.

JOHN WAKEFORD
Chairperson, British Sociological Association.

Allegations ill founded

Sir,—I am surprised and [illegible] appointed that a journal of [illegible] standing should, without further inquiry, have printed in its edition of March 28 a report by Mr Linda Wright, of Wellington, concerning allegations appearing in a [illegible] newspaper about the biology [illegible] laboratory at this university [illegible] deaths from cancer among students here.

However ill-founded such allegations might have been, once the had been made in the student newspaper and taken up by the national press and other news media it became necessary for me to ask the minister of health to establish an independent panel of experts to look into the report on them. It seems to be an unfortunate fact of life that many people tend to accept without question emotive public statements which have engaged their sense of outrage rather than challenge the basis of such statements.

The independent committee of four senior experts in the relevant fields of medicine and science duly went about its work at considerable public expense and many highly responsible members of my university spent long hours in presenting the facts of the matter. In the meantime, of course, some representatives of the news media had a field day with sensational headlines and garbled reporting.

The result of the inquiry would have come as no surprise to anyone who had taken the trouble to find out in the first place what levels of radioactive material were in fact being used in the biological sciences department here, and what procedures were followed in using it. The inquiry found that there was no relationship whatsoever between this cause of death and exposure to ionizing radiation as suggested in the allegations and that the relevant laboratory facilities here were being properly maintained to the very strict standards laid down by the New Zealand National Radiation Laboratory.

This is precisely as we had always known the case to be. Unfortunately, as you are aware, of those who read such ill-founded allegations many do not read the subsequent rebuttals, and of those who do read the rebuttals many are left with an uneasy feeling that there must have been some substance to the allegations, otherwise it would not have been necessary to set up an independent inquiry! This is the "no smoke without a fire" conclusion and it is almost impossible to dispel it. And that is why I and the members of my staff were surprised and disappointed that you should have printed a report on the allegations in your journal without seeking to clarify the outcome of the inquiry to be made known or without, at least, first consulting me.

D. R. LLEWELLYN,
Vice-Chancellor, University of Waikato, New Zealand.

It's all Greek

Sir,—It was inevitable that someone would eventually produce a "trichotomy" in print (see the review by Martin Warner, THES, April 11). It is clearly derived from a "dichotomy" on the assumption that *di-* implies two and *chotomy* something like separation. This is not the case: the roots are *dichotomeein* meaning "sever" and *tomos* meaning "cutting". Though *dichotomeein* is connected with the Greek word for "two", it can mean any number of things.

When, then, should a trichotomy be used? Since the Greek word *trichomes* means "hair", Mr Warner has unintentionally produced the Greek for "haircut". Or perhaps he laugh is on me, for splitting hairs so pedantically. Mr Warner may have intended to suggest very subtly, that Aristotle's three-part classification of rhetoric was too nit-picking. If so, his neologism may have a use in the sense of "pedantic three-way [illegible] ing", "trichotomy" may yet survive.

GREG BROOKS,
University of Leeds.

Letters for publication should arrive on Tuesday morning at the latest. They should be as short as possible and the editor reserves the right to cut or amend them as necessary.

TIMES PAST THE TIMES
HIGHER EDUCATION SUPPLEMENT
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The lot of the academic proletariat

Young researchers on short-term contracts are likely to be the first—and perhaps the only—staff victims of the present squeeze on higher education. In contractual terms they are second-class citizens surviving precariously on the periphery of higher education. Yet in terms of the advancement of knowledge—terms in which higher education likes to be judged—such people play a core role, often more important than that played by aging teachers with the full protection of tenure. In an almost literal sense, *they are the proletariat of the knowledge industry*, easily dispensed with but indispensable.

Sadly it is the former rather than the latter aspect of their condition which is likely to be given most emphasis during a time of financial retrenchment like the present. It is extremely difficult (the AUT would say impossible) to make a fully tenured university teacher redundant. The position in polytechnics and colleges is almost as rigid although since the run-down of teacher education not perhaps as unthinkable.

But this determination to defend the jobs of those in tenured posts means that any contraction in the total number of academic staff will be concentrated on those who lack such protection. Prominent among the latter are young researchers on short-term contracts, to whom lack of tenure once seemed a less damaging disability. In times of steady expansion and generous funding, one short-term contract led to another and *finally* with moderate *luck to a permanent post*. No such *hopeful* assumption can be made *today*. In the 1980s a research *career stands* a good chance of being hasty, brutish and, above all, short.

It is much easier to state the dilemma than to propose an effective solution. "After all, universities can hardly be blamed if they use short-term contracts, just as they use retirements, as the least painful way to reduce overall staff numbers. They would be blamed much more if they insisted on compulsory redundancies among tenured staff in order to keep up the number of short-term research posts.

Yet something must be done to improve the position of young researchers in higher education. Today most research, with the doubtful *exception of the more traditional* humanities, is a collective enterprise which depends on the work of a team. Less and less are such research teams organized on the basis of strict partriarchy. So it is deeply repugnant that some members of a team—almost by chronological accident—should enjoy the special privilege of tenure, higher pay, and greater academic recognition, while others should enjoy little or no security of employment, lower rates of pay, and sparse recognition.

In any case the plight of research staff is part of a much graver problem—how is higher education to continue to encourage intellectual creativity now that the fair following wind of expansion has been replaced by opposing squalls? The position of postgraduates (including those from overseas) who help sustain research projects, and the opportunities for bright young people to join the academic profession during a period of staff stagnation, are two more aspects of the same problem. So it is wrong to see the deteriorating conditions that *researchers on short-term contracts* face as simply an industrial relations issue, or even a question of equity.

At present there is a danger of a proliferation of uncoordinated policies designed to combat detailed ills, which are all really aspects of the same large problem. Research councils may experiment with special postgraduate studentships. The vice-chancellors may try with the idea of early retirement to clear the promotion and so the recruitment log-jam. The UGC and the ABRC may set up working parties to examine the future of the dual support system of research funding.

There is an equal danger that maintaining the conditions for research staff will continue to receive a much lower priority than maintaining the number of postgraduate students or measures to speed up the recruitment of new young university teachers. Yet it is as or even more important. In the natural sciences, medicine, and engineering research will atrophy if no attention is paid to the deteriorating position of young researchers. What is required is an overall and coordinated policy designed to protect the research excellence of higher education, and in particular of the universities. After all, this is one of the British system's most renowned attributes.

Such a policy will have to include a fair deal for young researchers. This will not be easy in present circumstances. It cannot be achieved by large injections of money—which is not necessarily a bad thing because if money had been available the temptation might have been to assimilate research workers into the permanent tenured staff so perhaps further increasing the staff rigidity in higher education.

Instead the problem should be approached on two levels, those of industrial relations and of the protection of higher education's capacity to undertake research. On the first level the AUT should oppose—perhaps more vigorously than in the past—and the universities should disown any further attempt to erode the conditions of service of research workers on short-term contracts. Already too much erosion has taken place and with the new Employment Bill the prospect is for more (because this Bill is designed to produce a balance of industrial power more favourable to the employer).

Instead, as Clegg hinted in its recent report on further education teachers' salaries, the pay and conditions of research workers should be renegotiated from square one taking into account their special contribution.

On the second level the priority must be to push the plight of research workers higher up the agenda so that this issue is at least equal in importance with the future of postgraduate education and the need for better equipped laboratories. It is certainly an issue which the Morrison working party should tackle, for it would be closely entwined with any proposal to modify the present dual-support system.

The vice-chancellors should also take up this issue in a more forceful way. If a special fund can be created for the support of especially gifted postgraduates from overseas, there must at least be a case for considering similar support for gifted research workers from Britain, who without such support might be cut off from any chance of pursuing an academic career. The UGC also should consider this question. Anyone or anybody concerned to *protect excellence in research* must also support a fair deal for research workers who contribute so much to the achievement of this excellence.

Time to tighten up continuing education

The idea of continuing education in spite of constant reiteration becomes no clearer. Everyone seems to be in favour of it but no one seems to be quite sure what it is. Some institutions claim to be heavily committed to it while their critics insist they are doing nothing at all. Indeed, it is almost tempting to characterize the rather unreflective majority attitude within universities, polytechnics, and colleges towards continuing education as "Model E and all that"—that is, a subject of formal and rather distant importance but one that is a little boring and hardly relevant to day-to-day academic life.

Because of this confused attitude any attempt to establish the idea of continuing education in a more central place in our view of higher education (zealots, of course, would argue that the positions should be reversed, with higher education occupying a subordinate place within a grander continuing education) is to be warmly welcomed. So the vice-chancellors deserve some congratulation for organizing a conference last week on "The Universities and Continuing Education".

For the same reason it is encouraging that the Department of Education and Science, in spite of the chill political wind, is continuing its follow-through from the 1978 discussion document and in particular of Model E, the continuing education option. Although continuing education now has to be cast in more "vocational" terms, it would, it is a relief to discover that such ideas are not dead and that the DES is about to publish a consultative document on part-time and short courses at the end of the month.

Yet, welcome as these two initiatives are, neither is likely to bridge the credibility gap from which the idea of continuing education continues to suffer. That can only be done by a lot more hard thinking within higher education about the direction the whole system should take in the 20 remaining years of the twentieth century. So long as continuing education is regarded as an optional extra, and in that candid phrase "extra-mural", little progress can be made.

Sadly, it was in this rather narrow context that the idea of continuing education was discussed at the universities' conference last week. Two threads of argument ran through the discussion. First, it was suggested that universities already made a considerable contribution to continuing education—a claim which can really only be sustained if recreational activities are included. The second was that more money was needed, either by the UGC diverting part of the university grant to this purpose, or the Government increasing the grant. Neither is at all likely to happen.

At one extreme of the continuing education spectrum myopia: at the other eyes that are *just too wide* open. The argument of the continuing education zealots is that the idea is a revolutionary one, a repudiation of end-on education and the integration of learning and life. According to them our present system of higher education should be remoulded in this revolutionary pattern. In practice such utopianism is the enemy of real progress.

What is required is a middle way that has more vision than appears to be contained in the universities' collective view at present but more realism than the utopians. To the former it must be emphasized that continuing education is not a new-fangled name for extra-mural courses, perhaps with a dash of entrepreneurism to suit Mrs Thatcher and ward off the danger of demographic decline. It requires both a redefinition of the priorities, and perhaps the purposes, of institutions and a reform of the traditional "core" of higher education. More readily available credit transfer, new forms of student support, and more flexible course structures are important ingredients—as Professor *Sims of Sheffield to his credit told* the conference. To the latter it must be emphasized that continuing education is not about building conceptual castles in the sky but about adapting the details of academic organization to make post-school education more accessible to the people.

Teacher shortages and the unpalatable remedy

A deluge of facts about shortages of specialist teachers in maths and science has formed the basis of many recent government documents and the topic of teacher conferences in the past few months. Anyone could be forgiven for imagining that this is a new illness and not one which has been with us in some measure since before the War.

Among the most often preferred solutions to overcoming this shortage is the offer of higher salaries to specialists in maths and science, not only to retain them in the profession but to attract them away from the higher rewards offered by other employers. But there is little hard proof that this would even partially solve the shortage or that it would in any way be acceptable to the teaching unions. The National Union of Teachers has already voiced its total opposition to any such proposal.

One of the more fundamental solutions lies in the provision of adequate in-service training for teachers at all levels. Local authorities have been particularly slow in bringing provision even to the level envisaged by the James report.

Many primary and secondary teachers willing to retrain in maths and science are unable to, simply because of their inability to obtain release, the lack of grants and the fact that there is no guarantee of obtaining posts or retaining their present ones.

It is clear that the Government should seriously consider increasing resources in this area, rather than considering offering bursaries and grants for initial teacher training in specialist subjects, although this might be considered better than nothing. To some extent the present Department of Education and Science Campaign to recruit teachers for training or retraining in shortage subjects is in the right direction but it needs to be on a much grander scale than at present.

The real longer term solution lies in a restructuring of the education system with the removal of specialization at an early age when too many youngsters are forced to opt either for the humanities or sciences with no option to transfer *later* on courses which might remedy their lack of knowledge. A short term but effective solution might be the setting up of transfer courses in maths and science subjects which could be available to able youngsters between the ages of 16 and 18.

Above all, what has to be removed is the vicious circle which begins in primary education and comes full circle in higher education where unqualified teachers of maths and science with little ability and even less enthusiasm for the subject impart their dislike to a majority of pupils.

What is clearer is that there is a paramount need for more resources to be injected in at all stages of the education system if we are to find an effective remedy to the shortages. Unfortunately, in the present climate this appears to be the last solution favoured by the DES.

Laurie Taylor

"Professor Clegg?"

"No, I'm afraid not, Dr Krankle. My name's Malcolm Grist. Professor Clegg is busy elsewhere today. Probably discussing his preference for a life of solitude with some Sunday newspaper or other. Oh, sorry about that. *Just a little staff* joke. No offence meant."

"You work for Professor Clegg?"

"Yes that's right. You've got it in one. I'm just a member of the team though. One of the backroom wallahs. Cleggies as we call ourselves. Roving financial bootboys."

"I beg your pardon."

"Sorry Dr Krankle. Another little staff joke. Cloggies . . . Cleggies? Oh well, never mind. Need a sense of humour on this job. All this endless comparison can go to your head. Went to the school concert only last week. Little kid up on stage reading Shakespeare's sonnets: 'Shall I compare thee to a summer's day.' Know what I said to my wife?"

"No."

"Depends on conditions of service. See how it gets you? Pity you can't meet Johnson. He's our factorial statistician. A laugh a minute. He was the one who came up with the idea of actually reducing polytechnic lecturers' pay. We nearly died laughing over that one. I wonder anyone kept a straight face at the press conference. Well down to business. You'll have got some idea of why you're here from out little letter."

"Yes, you're anxious to find the most appropriate comparison group for university lecturers, and you want my views on the matter."

"Quite so. Your name came up on our little sample and here you are. Now before we start Dr Krankle I'd just like to speak quite frankly about this whole notion of comparison. Can raise hackles. You see most people who come along to talk to us here at the commission think they're pretty incomparable. No one else does a job like they do. And that means our initial task is to clear away that little misconception. Say to them: 'Look, you may be a university technician among your colleagues, that may be the title on your door and your contract, but as far as we at Clegg are concerned you're a council readsweeper. That sort of thing. Get the idea?'

"It seems rather ad hoc. I mean isn't there a scientific way of managing these comparisons which would rule out the human element?"

"Oh yes indeed. It's all computerized you know. Feed in the details of the job and the computer matches it up with another."

"Well couldn't you just do that then? Why interview anyone?"

"Quite frankly—its political sensitivity. You can't just take the computer's word. There'd be an uproar. I mean, take the first readout we got on dons."

"What was that?"

"Well we fed in all the stuff from the list of university lecturers' characteristics prepared by the AUT: length of training, reliance on specialist knowledge, conditions of service, with particular emphasis on the relative solitude of academic life and the infrequency of meaningful contact with colleagues, degree of responsibility, plus of course average numbers of hours worked per week, time put aside for reading, and then general job description—you know, continuous concern with the illumination of others. And bang, up came the comparison group."

"What was it?"

"Not a word?"

"Promise."

"Part-time lighthouse keepers."